ISSN 0001 253X

CUK-H04144-25-P001521

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1977

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P 1521

Printed in Great Britain at the Alden Press, Oxford

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Aslib Proceedings

VOLUME 29 FEBRUARY 1977 NUMBER 2

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Aslib Proceedings *is published monthly and supplied free to members of Aslib. Annual subscription: UK, £22.00; Overseas, £27.00; North America, $65.00, additional copies to members, £11.00 ($30.00). Single copies UK, £2.00; Overseas, £2.50; North America, $6.00; members, £1.10 ($3.30).*

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An on-line system for handling personal data bases on a PDP 11/20 minicomputer

P. Leggate, B. M. Eaglestone,*
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Paper presented (in part) at the 50th Aslib Annual Conference, University of Exeter, 20th–23rd September 1976

INFORMATION RETRIEVAL IS a sequence of selection and discrimination steps, aimed at the production of progressively smaller subsets. A great multitude of documents are prepared for publication by aspiring authors and though editorial control produces some weeding-out, a high proportion are probably published in one form or another. From this published literature are selected those items to be included in the large indexing and abstracting journals, on the grounds of either quality or subject matter. These publications are then searched by human scanner or computer to select the small minority of bibliographic records which may be of interest to the ultimate user. Then it is the user's turn. He selects from the bibliographic listing a yet smaller number of documents he wishes to view and, finally and occasionally, in a few of the documents he reads, he finds useful information: a datum, an experimental method, the barely discerned inkling of an idea.

In theory, storage and retrieval problems could end when the user has been presented with a list of references. When he has read the few documents of immediate interest, and absorbed any information of immediate interest, the result of the whole selection process can be discarded. When a new information need arises, whether for similar or dissimilar subject matter, he returns to the appropriate secondary sources and repeats the selection process.

In practice, information consumers often wish to retain records of bibliographic material encountered, both for their own use and for sharing with colleagues. Indeed, much material thrown up by a search may have little immediate value, but much potential future value. The researcher, technologist, or manager therefore creates a personal index, most commonly in the form of a card index or notebook. The communal records of the *public* data base are transferred to a *private* data base, and given a unique identity by being reformatted, annotated, indexed or abstracted to suit the personal requirements of an individual or a group. Each personal index is idiosyncratic to the

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Aslib Proceedings, 29 (2), February 1977, p. 56–66. Printed in Great Britain

extent that its content and organization reflect the nature of work, the method of working, the technical environment and the personality of its progenitor.

Computer support for personal data bases

The main effort in the use of computers for handling bibliographic records has been directed at the large public data bases, but there has been a long-standing interest in providing some form of computer support for the individual's personal indexes. The simplest method of support is to provide for the production of printed indexes from a machine-readable personal file. An early example is SURF, developed by Wallace[1] at the System Development Corporation (SDC) in 1966. Wallace's 10-year old comment on the need for such systems is instructive: '. . . so far these applications [of data processing to information retrieval] have been confined largely to centralized information services that are, necessarily, limited in their capacity to respond to the immensely variegated, changeable, and time-dependent information requirements of technical personnel. That these limitations are real and troublesome is reflected in the increasing number and results of user studies and in the (so far) rather equivocal attempts to measure and evaluate the effectiveness of these systems and services. Then there is the growing proliferation of small specialized services and centers that, from the viewpoint of managerial control and planning, tend to sprout up like weeds in a well-tended garden. An additional kind of evidence is the prevalence, persistence and size of personal and office files.' Similar packages for index production are ACCESS[2] developed in the Computer Science Department at Stanford, and INDEX reported by Bridges.[3]

Another form of support is to provide for searching of the machine-readable file. One of the most comprehensive of the early systems of this type is FAMULUS (1969), developed by Yerke,[4] made widely available as a FORTRAN package, and still extensively used. FAMULUS is not designed for on-line interactive use and, though it provides extensive search and file-editing facilities, its primary value must be still considered as the production of printed indexes and listings of various types. Some of those using our own experimental system were transferred to FAMULUS on the Oxford University 1906A when the experiment ended.

Handling bibliographic files is one of the functions which could be carried out by most on-line text-editing systems, such as SCRAPBOOK[5] (National Physical Laboratory), SHOEBOX[6] (Mitre Corporation) and AUTONOTE[7] (University of Michigan). However, only in the case of AUTONOTE is there a specific mention by the originators of the system of the maintenance of bibliographic files as one of its functions. Thus, AUTONOTE is described as an on-line system which allows the user to: 'Store any kind of textual material in whatever format he finds convenient. Typical materials users enter include notes, bibliographic references, drafts of papers, ideas for further research, hypotheses, illustrations and paradigms, and transcripts or synopses of conversations with other scientists. In short users enter those things they could not remember in entirety, but which may be of use at some later date.'

Computer support for bibliographic files is also related to another type of personalized computer facility, the Research Data Base for handling data collected in the course of the user's own research. RIQS (Remote Information Query System)[8] developed by Mittman and Borman at Northwestern University, Evanston, Illinois, is of particular interest in that it was designed to offer on-line access to both bibliographic and research data bases, and its various applications have been extensively documented in book form.[8]

Minicomputers

The ease of access resulting from the absence of complex protocols would seem to make the minicomputer especially appropriate for personal file-handling systems. Several applications of minicomputers in this area have been announced[9–12] since the present project was started at the Experimental Information Unit (EIU). An example is CAIRS (Computer Assisted Information Retrieval System),[9] a package developed jointly by Libra Information Systems and the British Food Manufacturing Industries Research Association (BFMIRA). CAIRS is designed for the maintenance of an organizational, rather than a personal file, though the distinction is largely quantitative. Implemented on a Texas Instruments 980 minicomputer, it provides for the indexing needs of a medium-sized industrial information department (12,000 items a year), and offers facilities for retrospective searching (on-line), for SDI (batch), and for bulletin production and report generation. A very different system is that developed for their personal use by Jackson and Hewlins[10] in the Department of Chemistry at University College, Cardiff. This system provides for the character-matching search of text (titles, bibliography) and Wiswesser Line Notation (a chemical structure file), and for identifying 'best matches' of mass spectrometry data. It is specific to the information requirements of a particular research group and is based on a Varian machine with 8k store and a magnetic tape unit, the minimum configuration for an information retrieval application.

The EIU's userfile system

The on-line system developed at the EIU was designed to offer its users a 'workspace' for the creation, maintenance and searching of personal files containing bibliographic and other types of record. The personal files developed in the project were referred to as *userfiles*, and the same term was used to describe both the program package and the experiment as a whole. The project originated from two separate lines of research interest:

(i) A concern with the possible uses of minicomputers in information retrieval.
(ii) A concern with computer support for personal bibliographic files: its feasibility, desirability, and the form it should take.

This paper is largely concerned with the second of these themes.

Subsequently these two interests became part of a conviction that national and international processing centres for large data bases need to be complemented by local facilities to achieve effective bibliographic service provision. The local capability would be much less powerful than its centralized counterpart, but would offer greater flexibility and could therefore be adapted to match the needs of individuals, groups or departments, and act as a support facility for a local Information Officer. In some cases large industrial organizations have already provided the equivalent of this 'local' facility. Large universities and small industries have not done so, and should beware the assumption that access to on-line searches of large data bases in London or Washington provides a complete solution to their storage and retrieval problems.

Design principles

The general design criteria which we adopted were:

(i) The system would accept whatever content or format the user wished to input.
(ii) The simplest jobs should be the simplest to execute (this is not necessarily achieved in more sophisticated systems; the provision of a gratifyingly large number of optional facilities may be to the disadvantage of a user who requires only the simplest facilities).
(iii) Users should contribute to the initial design and the subsequent development of the system.

Hardware

The userfile system was implemented on a Dec PDP-11/20 minicomputer with 12K cpu, a 2.4 megabyte disk pack, twin DECtapes and an industry-compatible magnetic tape deck. Texas Instruments 735 KSR terminals were located in the departmental libraries of the Dyson Perrins (Organic Chemistry) Laboratory and the Inorganic Chemistry Laboratory. Both terminals were at a distance of about half a mile from the PDP-11/20 and were linked to it by leased Post Office telephone lines.

Software

The programs were written in DEC's Macro-11 assembler language for a disk operating system with no time-sharing facility and are therefore configuration-bound. A serial file structure was adopted. Programming was much simpler than for an inverted file and, in particular, record editing and front-end truncation facilities were easily implemented. Search speeds were predictably slow,* though no objections were made by the users.

Experimental population

All staff and research students in the departments of organic and inorganic chemistry in the University of Oxford were given the opportunity of making use of the system. Ten staff members and twenty-one students made some use of the system and eight userfiles were created.

File content

Participants were encouraged to include any type of material in their files: research notes, numerical data, telephone numbers, memorable quotes, bibliographic records, etc. They chose to use their files exclusively for bibliographic material, reflecting the content of their existing card indexes, and the only software written was for handling these and other text files. Software for the manipulation of numerical data was not provided, though a prototype file containing NMR data for acetylenic compounds was assembled, and searched with the text-handling software. The system was fully operational for only 14 months. It is a matter of conjecture whether a more extended trial of (say) 3–4 years would have resulted in the inclusion of a wider range of non-bibliographic types of material, as users became more familiar with the different ways of exploiting a computer-based system.

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* No detailed analysis of search speeds was made but a search through a file of 500 records containing an average of 200 characters per record would take about 1 minute.

Record structure

A major departure from other personal file handling systems was the almost complete absence of facilities for controlling record format. Within the record delimiters the user could include any type of material, organized in any way he desired, with no requirement for consistency between records. The only constraints were a maximum record length of 1,722 characters, which could be varied at the programmer's discretion, and the requirement that each line of the record must start with a space unless the previous line ended with a hyphen. This rule, which was automatically enforced by the software, was to ensure that searches of "NUCLEAR" or "NUCLEAR" (*i.e.* words with preceding or following spaces specified) would retrieve words at the beginning or end of a line. There was also an option to include a *tag*, a unique alphanumerical record identifier, at the beginning of each record.

561			[the tag]
	⟨A⟩	SMITH AC	[A = author]
	⟨T⟩	EUROPIUM COMPOUNDS	[T = title]
	⟨J⟩	J.AMER.CHEM.SOC. 83, 271–5	
	⟨I⟩	PREPARATION	[I = index term]
	⟨D⟩	DESCRIBES SYNTHESIS BY TWO ROUTES	[D = digest]

FIG. 1: *Example of an abbreviated record containing both a tag and flags*

There was, therefore, no provision for identifying different types of information in a record, *e.g.* titles, index words, author names, bibliographic references, abstracts, etc. Hence there was no possibility of searching only a part of a record or of printing only a part of a retrieved record. Users were encouraged to include flags of the type ⟨A⟩, ⟨T⟩ to delimit different data elements, and most did so. Figure 1 shows an example of an abbreviated record containing both a tag and flags. These flags were included in anticipation of a future need for the production of printed indexes. They were 'inactive' in that the existing search program did not use them to identify individual term types.

A further consequence of the use of unformatted records was that there was no check on the format of particular parts of bibliographic entries. For example, an author's name could equally well appear as SMITH AB, AB SMITH, A.B. SMITH.

The decision not to provide facilities for record organization resulted from our belief that record formatting would contribute to the 'strangeness' of a computer system and inhibit its use. Formatted records could of course have been an optional facility, but we wished to avoid any suggestion that rigorous and apparently complex formatting rules were a necessary adjunct of a computer system for handling personal files. Individual users could of course still devise and apply their own rules for organizing records, but the system gave no assistance in imposing adherence to these rules. In fact, past habits ensured fairly standard formats in most files. This policy would not have been appropriate for files of data, for which rigorously formatted records are essential.

Command options

The following commands were available to users:

FIND [followed by a 'Boolean-type' search query]: to retrieve records
GET [followed by a tag] : to retrieve a specific known record
INSERT : to insert a new record
EDIT : to edit a record located by FIND or a newly inserted record
SAVE : an instruction to the system operator to transfer a record from one file, from which it has just been retrieved, to another.

Particular emphasis was placed on the need to be able to move easily from FIND to EDIT and back again. Thus, if in the process of a search the user encountered a record he wished to change, he could immediately call EDIT. When he exited from EDIT, he was automatically returned to the search which had been in progress. Also, an edited or inserted record, though stored on a temporary file which would later be merged with the main file, was immediately available for searching.

Search queries

Search queries took the form:

FIND "PEPTID" GO
FIND "MASS SPEC" AND 'CARBON' GO
FIND 'SMITH' AND ('1967' OR '1968') AND NOT 'TETRAHEDRON' GO

The query language may seem an unimaginative choice but several other possibilities were considered and rejected. The choice was influenced by the assumption, which proved correct, that most queries would be of the simple types A, A *and* B, A *or* B, and that such queries should be easily input without intervention of system prompts. This is in partial contrast to other on-line systems such as RECON, in which the system prompts the user to provide each term and then a logical statement. Though the language proved satisfactory, we feel that 'prompted' alternatives should be considered. One possibility is the form of query used by Jackson and Hewlins,[10] in which successive computer prompts each require a term preceded by a logical operator. Thus, the query (A *and* B) *or* (C *and* D) might take the form:

1. A (computer prompts underlined)
2. +B
3. C
4. +D

The userfile system catered for search queries of any level of complexity but with an arbitrarily imposed limit of forty-four terms per query. The search was for character strings, not words. Hence front- and rear-end truncation was automatic and, for example, 'SMITH' would retrieve both SMITHSONIAN and BLACKSMITH. In order to search for a word, a prefix or a suffix, the word delimiter had to be included in the search term. This would most commonly be a space, *e.g.* "NUCLEAR". Note, however, that this term would not match with the word NUCLEAR if it were preceded or followed by a punctuation mark.

The absence of 'term types' within a record could in some instances simplify the search query. For example, a searcher interested in papers on Europium compounds written in the 1960s, or by Smith at any time, would not have to specify that 'EUROPIUM' is a word in title, abstract or index terms, that 'SMITH' is an author, and that '196' is a date. The corresponding disadvantage is obvious; a search for '112' might match with an isotope number in a title, a page number, or a street number in an author's address.

From an analysis of the recorded dialogues, discussions with the users, and our own use of the system, we concluded that neither unformatted records, nor the character string search, created any significant difficulties in searching the file.

The command language

We deliberately chose an unabbreviated, explicit language even at the risk of it being verbose and sometimes cumbersome. Commands and logical operators (*e.g.* FIND, AND) were spelt out instead of being single letter codes, quotation marks were used to delimit search terms, and error messages listed all alternative acceptable replies. It was believed that this would make it easier for users to learn the system, and for the occasional user to remember what he had learned. A much abbreviated version for the experienced users was included in the initial system design, and was subsequently requested by more experienced users, but was not implemented due to lack of time.

The userfiles

Eight research groups created files for use by the group; three students also created their own individual files. The number of records in the group files were: 119, 236, 468, 864, 1,166, 1,641, 1,794, and 5,707 (divided according to age into 3 sub-files). The amount of information in a record varied from a 3–4 word abbreviated title to a 5–6 line abstract. Average record sizes in the 8 files varied from 146 to 393 characters per record. We also keypunched a 4-year file of Electrolyte Solution Bulletin, which is produced by Dr A. K. Covington in the Department of Chemistry at Newcastle University in collaboration with the University Library, and is distributed to research workers in the field throughout the world. This file contains 4,000 records (194 characters/record). We also provided on-line access to the current month's tape of Mass Spectrometry Bulletin (560 records, 350 characters/record) and to annual cumulations.

To enable files of realistic size to be created in the lifetime of the experiment, the EIU undertook to keypunch existing retrospective files, and continued to provide a back-up data preparation service throughout the experiment. Users could either input material on-line or ask for it to be input by the Unit. Six files contained material from existing card indexes, and one file was created from the output of a broad retrospective search of *CA-Condensates*. Current input to the files was provided by *CA-Condensates* profiles (2 files), an *ASCA* profile (1), scanning of *current contents* (1), and by other manual current awareness methods (2). The great majority of records in the userfiles been located by manual search methods. At the beginning of the experiment we had believed that userfile systems would complement the services offered by large processing centres, and that in the longer term most input to userfiles would be a machine-readable output from searches of public data bases by these centres. Though we still hold this belief, we did not find any wide support among our user population.

Use of the system

The system was considered as fully operational, and accessible on-line at least from a terminal in the Dyson Perrins Organic Laboratory, for a period of 14 months (July 1974 to August 1974). However, the second terminal in the Inorganic Chemistry Laboratory did not come into operation until January 1975. During the 14-month period 197 terminal sessions were recorded, though the heaviest use of the system (133 sessions) was concentrated into a 5-month period, February to June 1975. In some sessions more than one file was accessed and the 197 sessions included 293 'file accesses'. An analysis of the usage of commands showed that sessions were complex in terms of the number of different operations performed by the user. In each session an average of 3.7 FIND, 3.9 EDIT and 2.1 INSERT commands were used. Users were not coming to the terminal to undertake a single search or to edit a single record, but to do several jobs.

These mean values do not reveal the main characteristic of usage: the great variation in patterns of use by different groups. This variety can be illustrated by reference to two of the participating groups. Thus, for one very large group, we created a file of almost 6,000 records from existing card indexes. The supervisor and nine research students together accounted for seventy-eight terminal sessions, 38 per cent of all those recorded, and were our most prolific users. The supervisor would draw the attention of individual students to items of interest by adding the student's initials to the record. When the student next used the terminal he would search for his own initials.

In a second, much smaller group, because of the subject matter, the supervisor concentrated on developing a controlled index language, and provided coded sheets for input to the system. The file was accessed on-line on only four occasions by one student. The time-scale was too short for the development of a file of realistic size by this means but it seems likely that the main use would be as an aid to organizing an index, and for the later production of printed indexes. This is just as valid a way of using the system as that of the first group.

Feedback from participants

Extensive feedback was obtained by the following methods:

(i) Pre-arranged interviews and informal meetings with EIU staff.
(ii) An initial questionnaire concerned with the existing personal indexes and reprint files of users.
(iii) A comments book located beside each terminal (but very little used).
(iv) A questionnaire completed after each terminal session for a limited period, and designed to assess *immediate* reaction to the session.
(v) A meeting to which all participants were invited.
(vi) A questionnaire distributed at the end of the experiment which sought the *considered* impressions of users on userfile systems in general, and the EIU system in particular.
(vii) Machine-readable records (on DECtape) were kept of all dialogues and were subsequently analysed in detail.

A questionnaire was also sent to a group of 'non-users' who had expressed an initial interest in the experiment but had not played any significant part in it. This feedback will not be discussed in detail in this paper, though it does contribute to our conclusions.

Conclusions

The userfile system was a 'try it and see' feasibility study involving members of eight research groups in two chemistry departments in a single university. This small, local population allowed for close contact with the users at all stages, and for in-depth feedback, but limits the generality of our conclusions. Rather than qualify the conclusions listed below by 'possibly' and 'maybe', readers are left to apply their own qualifications for the limited size and distribution of the population.

1. Firstly, an unequivocal yes. There is a demand for, and a need for, personal file handling systems in university science departments. The storage and retrieval of references, once they have been located, is at least as great a problem as finding the material in the first place. Demand for a userfile system could be as great as for SDI or on-line search services, and similar levels of charging might be acceptable. Those likely to profit most from this type of system are the large information-conscious research groups who find the communal card index an unsatisfactory method for sharing bibliographic information. The computer system can serve as a means of communication among members of the group, and may be preferred to a

card index, if for no other reason, because it can be made less prone to destruction by multiple use.

2. *Flexibility.* The central feature of a personal file handling system must be the flexibility to accept content of different types, and to adapt to many different patterns of use, which reflect the idiosyncratic character of a personal index. For example, the system must cater equally well for those who want printed indexes, computer searches, sub-file creation, or all three. It must provide for those who wish to acquire subsets of existing machine-readable files, and for those who wish to provide input by their own manual searches; for the frequent 'expert' user, and for the infrequent user who has to relearn the system each time he approaches it.

3. *Ease of access.* Easy establishment of the on-line link and simplicity of use are even more important with a userfile system than with other types of on-line searches, if the searcher is to use such a system for the 'trivial' day-to-day requirements for which he now refers to a card index. Searches of userfiles are unlikely to be delegated to an intermediary, and difficulties with telephone operators (or systems), or with complex computer protocols are an unacceptable hazard to a researcher who wishes to check whether a reaction is to be run at 70°C or 30°C, when the reaction has already started, or whether SMITH's initials are J.C. or J.B.

4. *User studies.* Investigation of the information habits of users was not a primary objective, but the experiment did confirm the conclusions of earlier studies by Jahoda[13] and by Burton[14] that the study of personal indexes provide a unique insight into the information habits of the user. It is undoubtedly one of the prime methods of gathering information by observation, rather than interrogation or experimentation.

5. *User assistance in system design.* The principle of 'user-oriented' design is probably accepted by all those currently involved in the development of on-line systems, but there is far less agreement as to what *is* user-oriented. The design of on-line interfaces, including the present one, is still highly dependent on personal preferences and educated guesses by the designers, with little empirical evidence on which to base decisions. Our experiment provided ideal conditions for obtaining in-depth feedback at all stages, but we concluded that user involvement in the design process, though desirable, is more likely to identify mistakes after they have been made than to establish design principles which would prevent errors occurring in the first place. Thus, participants in the experiment thought that the facilities we offered were the right ones, and that the system performed well, but they had little basis for comparison. For example, in reply to our questions, users considered the 2–4 minute delay in accessing the system to be acceptable, and ranked facilities for the production of printed indexes, which we did not provide, as being less essential than those which were provided. Their views might have been very different if we had provided them with experience of push-button, instantaneous access, and could have offered a facility for index creation.

To obtain the design information which *is* needed will require studies of the type already undertaken by Carlisle[15] and by Walther[16] in which particular parameters of the interface are examined under controlled conditions which allow comparisons to be made among the reasonable alternatives. Such experiments should provide a clearer picture of the conditions under which, for example, a VDU is preferred to a teletype, or a verbose to an abbreviated command language.

Acknowledgments

The authors thank the members of the two Oxford University Chemistry Departments who contributed a great deal of their time to the project. The project was supported by a grant from The British Library Research and Development Department; the grant holder was Professor Sir Ewart Jones, FRS.

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The centre for research on user studies: aims and functions

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Paper presented at the 50th Aslib Annual Conference, University of Exeter, 20th-23rd September 1976

THE CENTRE FOR Research on User Studies is in its simplest terms a group of people charged with the responsibility of becoming the UK national centre of expertise on user studies, a centre with the four principal and interconnected roles of research, education, advice, consultancy and information. What these imply will be made clearer in due course. First I will try to give the background to the creation of the Centre which will I hope simultaneously answer the query: 'Why set up a user studies centre?'

As Coover[1] stated, 'a determination of the needs of users is absolutely essential to the management of an information center . . . [which] exists only to provide service to user groups [and] this organization must continually appraise the needs of users in order that the information center can obtain and have available what the user needs when he needs it. In fact, the value of the information center can be known only in terms of satisfying the user's needs.'

Fearn and Melton[2] have pointed out that studies of user behaviour are necessary to predict the demand for various products and services so that library resources can be efficiently allocated. I would disagree with their use of the term 'efficient', I would prefer to use the term 'effective' but this is an argument I will develop later.

One of the most important developments of the research in the libraries and information field in the last 20 years has been the growing emphasis on the *user*. This trend means that the focus today is not so much on the system *per se*, but on the system and its response to the needs of its users and therefore as something alive and dynamic, responsive to the changing patterns of needs, sensitive to and designed to ensure the provision of feedback. The growing emphasis on the user is causing libraries to reappraise their roles and the services they provide. Such reappraisal will almost always lead, I would suggest, to more user-orientated, more outgoing directions with more emphasis on service and less on conservation.

One important consequence of this shift in emphasis to users and their needs has been the production of a great quantity of user surveys of different types of varying quality.

These fall into two broad groups:

Aslib Proceedings, 29 (2), February 1977, p. 67–76. Printed in Great Britain

1. Library-orientated studies—the investigation of how individual libraries or information centre are used.
2. User-orientated studies—how a particular user group obtains the information needed for the conduct of its work.

Less has been done on the *use* of the information obtained and although frequent mention is made of user information *needs*, in practice this has been restricted to examining a user's *demand* for information and usually *effective* demand as there is yet no consensus on the definition of information need, let alone how to measure it.

Most of the significant work has been done in relation to the information-seeking habits of scientists and technologists while social scientists were studies by the INFROSS project[3] and lately attention has turned to the information requirements of local government. There has been little done in the fields of industry, business and commerce while the general public on the whole has been neglected apart from readership surveys.

Whatever the merits and demerits of past research, there are very few areas of library and information research which are untouched (or should be) by the need to study the user. Even research upon some aspect of the system will be sterile unless it takes into account possible repercussions (of the systems) upon the user. Therefore, the need for the expertise and skills concerned with surveying people's behaviour, preferences and habits, with the collection of sound data and its analysis is very evident. Considerations such as these influenced the British Library when their thinking began to move towards the idea of a national user study centre. They saw a need for tidying up, a systematizing of user studies, the supplying of advice and training, the more positive objective of standardizing user study techniques and data-collection methods and the establishment of a small core of expertise which would be permanent and not disbanded at the end of a specific research project as has tended to be the case to date. Above all, the British Library became aware of the need for a multidisciplinary approach to user studies. It was clear that skills from a wide range of disciplines were called for—sociology, psychology, market research and statistics came to mind right away.

In addition it was realized that many researchers, particularly those new to the research process, often face problems of having to design samples, questionnaires and similar technical matters. Expertise is available on these problems but it is often a question of who to ask and where to find it, whereas if there was a national unit located in one place staffed by people experienced in these matters, then it could provide an advisory service for researchers.

Thus we had a situation in which the British Library was beginning to recognize the need for a centre of expertise in the diffuse area of user studies, but how did Sheffield enter the scene?

The School of Postgraduate Librarianship and Computer Science of Sheffield University for more than a decade has been involved in research, much of which is in the field of user studies: for example, the Language Barrier study[4] and the Local Library Co-operation project.[5] In addition to several of the School's staff who were very much interested in user study problems such as library use and information use in the humanities, there was the Reader in Sociology whose research interests are in the sociology of communication and who has written an important study on students and books. I refer of course to Dr Peter Mann.[6]

Therefore, Sheffield possessed a sound base of existing experience, expertise and interest in user studies, had an established reputation and valuable research contacts so that the Centre would be firmly-based on well-established interests. It would be able to capitalize on the wide range of experience available in the University and a close relationship with an educational institution would be obviously beneficial in terms of the Centre's educational function.

Area of study

What is the Centre's sphere of interest? In part it is self-explanatory: user studies, but then the next important question is that of defining user studies. Many people have advanced various definitions and, in fact, members of the Sheffield staff engaged in this exercise during the first few weeks of the Centre's existence.

It is fashionable to give definitions in the form of an apposite and terse phrase but, unfortunately, the more concise the definition the less it embraces. It is the eternal problem that we face in analysing data—that of choosing a good measure of a variable, the problem of parsimony versus comprehensiveness.

1. SOURCES communicate MESSAGES by CHANNELS to RECIPIENTS.
2. WHO says WHAT to WHOM through what MEDIUM and with what EFFECT.
3. WHO (demands) WHAT from WHOM and WHY
   (needs)
   (receives)

FIG. 1: *Definition of user studies*

Herner and Herner[7] give their classic definition couched in terms of messages and channels (Figure 1) while the second is a paraphrase of a classic sentence in the Sociology of Communication of Dr Mann. But owing to the structure of syntax, a flow is implied from the subject to the object of any sentence and therefore both definitions give the impression of the information originator (individual or system) as the important part of the process, the user being cast in a passive role.

The third sentence is mine and it hopefully restores the user to his rightful place as the principal object of study. The verbs are interchangeable and by putting them in the negative we are immediately concerned with the important problem of the non-user.

However, for the practical purposes we have decided to approach the problem of our field of interest pragmatically and in a negative way—decide what is *not* our province and continue from there.

I envy those researchers who are concerned with information systems and management, as their operational field is closely defined, *e.g.* a library is a clearly defined entity with statutory powers and obligations. It tends to be easier to study elements of a clearly defined entity rather than the chameleon-like user.

This is not to say that we can ignore the system or that system-researchers should ignore the user. Clearly we must study the system as it interfaces with the user, it so often is the source of information and as such is an important element in the communication and transfer of information.

Conversely, the system exists to serve the user and therefore information providers must always consider the users and continually assess the effectiveness of the system. I said 'effective' not 'efficient' as I define the first word in terms of the extent to which systems meet users' demands, whereas 'efficiency' relates to the functioning of the system and need not necessarily, though it should, related to the user.

I would like to see information centres become so effective in providing for the public's needs and demands, that, in the first instance, their efficiency declines because of the overwhelming demand on their services.

We in the Centre define information in its widest sense and do not restrict it to the purely factual and educational such as 'who is entitled to Family Income Supplementary Benefit?' or 'is there a market for my products in Tanzania?' but include the recreational aspects—'who scored in the last England-Germany soccer match?' and the realm of imaginative literature. Therefore, the book trade comes into our field of investigation.

Bookshops, as much as libraries, are an important intellectual means to a very similar end, in fact taking into account the sale of paperbacks, magazines and women's romances, bookshops and bookstalls probably cater for a larger and wider segment of the population than public libraries.

Both information centres and bookshops make assumptions about their markets, which may or may not be correct, and it is crucial for both that they should know as much as possible about their user's needs and demands. The big difference is that if a bookshop is wrong too often it goes out of business, whereas if a library is wrong it is used less than it should be but it does not necessarily go out of business, it merely becomes a burden on the rates and a company information centre may not be adequately costed so that its contribution to the company's profits may not be known.

One important area of study for the Centre is that of the *non-user*—the 70 per cent of the population who never use a library, the 50 per cent or 60 per cent plus who never buy a book. There is not such a creature as a non-user *per se* as everyone needs and uses information to function as a member of society in any one of the multi-roles a person assumes during the course of a day. What is interesting is where and how the non-library users or non-book buyers obtain their information. These people could be part of an entirely different information network—knowledgeable friends, neighbours and workmates, the television, newspapers. It might be postulated that these sources are less complete and less efficient than the information centre, library or bookshop, but it may be that in stating this we are letting the petticoats of our literate, middle-class upbringing show beneath our objective research skirts.

But, until we study the lifestyles of people and determine the information requirements of their different roles we cannot decide on the effectiveness of the existing information-providing structure and how it can be improved or extended. One fact that is clear from past research is that the image held by the public of a library as a middle-class, sombre and stuffy establishment needs changing.

To this end I welcome developments such as the North Tyne public library which has renamed itself as a Book Centre, and another library lends out toys and games as well as books, records and cassettes, while another places boxes of paperbacks in factories using a 'take it or leave it' philosophy—people are free to take what they want, there is no one to keep records and readers can deposit their own books in the boxes if they so wish.

Immediate research

It will not come as a surprise to learn that one of our research projects concerns itself with the information requirements and use of the general public. It originated as a study of the general reader—who used public libraries, when, how often, why, their reading habits and, very importantly, who did *not* use the library and why not? But it soon became clear to us that libraries were only one part of the total information structure of the majority of the public; for example, while I myself prefer to buy my fiction books I use a library for information upon a research topic, but for information on how to solve a practical problem I go to a knowledgeable friend who can inform me and answer queries in an interactive mode.

It also became evident that there was a clash of terminology. While researchers may speak about the 'information requirements' of the general public, members of the public do not recognize that they have anything as esoteric as an information requirement, but they have practical problems and they need data, advice and information on how to solve them. Therefore, the research project is geared towards the identification of the totality of a community's information needs—everything from the essential information needed to solve the problems of everyday life in a complex society through to the information needed for recreational and leisure purposes. We wish to know more about the choices made by people in regard to information sources and media: some sources, particularly the formal ones, may require a strong effort if they are to be used, while others, such as asking a knowledgeable friend on how to rewire a house may not be consciously seen as using an information source at all. All manner of factors influence people in their choice of an information source from education and social class through to previous personal experience and preconceptions. We intend to collect information data from a sample of householders and examine their socio-economic characteristics, book buying, borrowing and reading habits, use of the media, leisure activities, views of libraries and their work, leisure and information networks. From this we hope to build up a picture of people's information requirements which will help us when we turn to the service or provision side of the equation. Some questions to be posed are: Are advice centres seen as too formal and paternalistic? Are bookshops seen as more forbidding or highbrow than general stationers? Is the public library regarded as too middle-class? Do people associate libraries with advice and information or with merely that of lending books? Are some people too inarticulate to formulate their needs? Is the problem simply ignorance of what sources and services are available, or is it a more fundamental one of 'us' and 'them'? Are the information services developed from over-sophisticated assumptions? How significant is the written word with other forms of communication? To those and similar problems we hope to find answers, the ultimate object being to help ensure that the total information resources are used to maximum effect—an aim which should always be borne in mind but especially in the present economic situation.

Another topic we are researching is the library and information needs of research workers in the humanities as much of the previous research has examined the information-seeking habits and needs of scientists, technologists and social scientists. The humanities project has a very topical and practical importance as restrictions on university library building and stocking make it essential to know how important the library is as a research tool in the humanities.

Do the humanities scholars need large collections of journals and on site? Does the value of such material tail off rapidly with age as in the sciences, or are extensive backruns needed? This last question is of practical significance in the light of the recent UGC thinking on university libraries and the proposed concept of 'self renewing' libraries.[8]

As a first step we are trying to find out more about the nature of the research process of humanities researchers. Initially, using semi-structured interviews, we will be asking researchers how they go about their research, how they started at what stages they require information and what kind of information and how they go about obtaining it. Do they use their library? If the information is not in their library, do they use the inter-library loans system or else their 'invisible college' or do they visit the British Museum periodically? How important are personal collections and indexes? How different are the individual humanities disciplines? To examine the longitudinal problem of research we are planning to monitor the progress of a group of research students working on higher degree theses in the humanities using a variety of methods. Initially this will be carried out at Sheffield University but if we come up with useful results we will extend it to other institutions for comparative purposes.

Another research topic we wish to study is in-library use at a somewhat more profound level than simple counts of people going into or sitting down reading in libraries. Methodologically this raises obvious problems but it emphasizes one aspect of our research in that it is not the function of the Centre to undertake the definitive research on any topic but rather to explore possibilities, to undertake exploratory studies and suggest ways in which certain topics might be researched.

Up to now, the research projects I have discussed tend to assume an academic air but it is not our intention to ignore the world of industry and commerce. We hope to be of service to information providers outside the academic and public libraries and we welcome enquiries from anyone in the business field for advice, consultation and collaboration in the needs of users in business.

Much of the previous research in industry has been concentrated upon the scientist or technologist but the sales manager and personnel officer need information and we should be studying the type of information that they need and the deficiencies in the present systems, especially in view of the parlous state of the economy.

All too often management information is equated with data processing and is the unusable and unwanted secondary statistics generated by computerizing the present financial and administrative procedures of a company.

Research methods

It is one of our functions to pay close attention to research techniques and methodological problems, as past user study research has been somewhat deficient in these respects. Speaking of past research, Skelton stated that 'problems of accumulation and synthesis are widespread because of the disparities in methodologies, scope, purposes and characteristics chosen for investigation'.[9]

Again, Burns and Hasty stated 'that for the most part studies of the user have devoted little attention to the methodology. The consequences . . . have been that most user studies are inadequate from a methodological standpoint.'[10]

Agreed, but to then conclude as some people do that the *methods* are inadequate is to miss the point as there are basically only three methods of collecting data in the social sciences—documents, observation and questioning. It is not that the methods are inadequate but that they are used inadequately; the relative merits and disadvantages of each technique, their theoretical basis and suitability for certain situations have not been fully comprehended. Add the generally poor research designs of many studies and the 'in-house' character of others and the lack of synthesizable and accumulative results becomes clearer to understand.

In every research project of the Centre there is to be an experimental element in that one or more research techniques will be tested or compared. In some we will be trying to solve methodological problems such as how to obtain a random sample of library users or how to effectively measure library use; in others we will be presenting a case study demonstrating the advantages and disadvantages of a particular method and 'how to do it' while in others we will be comparing several techniques in one project.

Much of past research is strictly not comparable due to inadequate research design and the different definitions and techniques used. What is needed is a procedure manual to assist the librarian and researcher to conduct surveys of their users and selected populations. It would contain a wide range of research techniques with instructions on how to use each, when to use them, how to select samples, how to analyse the data and present results, and so on. The manual would be in a modular format allowing one individual to select the particular set of techniques and procedures most likely to answer specific questions. Sample questionnaires and interview schedules would be included together with standardized definitions of terms. The latter in itself would be a significant improvement in the field.

The use of such a manual together with standard definitions would ensure that the results of user study statistics could be accumulated and compared to provide an empirical base for the development of theory. The production of such a manual is one of the major uses of the centre and to this end we are contracted initially to produce a manual for use by policy-makers in Third World countries.

One reason, I feel, for the methodological inadequacy of many past studies is that researchers in the user studies and information field come from widely disparate backgrounds, and many practitioners have had little or no quantitative training; even those with a science background may not appreciate the problems and difficulties of social science research methods such as sample design, question-wording and the design of interview schedules.

Education

Therefore, as part of its education function, the Centre intends to run courses on methodology in addition to producing a procedures manual and publishing papers on specific methodological issues. The first course is planned for early 1977, others will follow in addition to Travelling Workshops in which we will give courses and seminars to interested groups. Already we have given lectures to students in the City University and have been invited to give a staff seminar at the College of Librarianship, Wales. Broadly speaking our courses, seminars and workshops will be of two main types: the methodological, which will train people to actually undertake user research, and the dissemination of the findings of user research.

The close link with Sheffield University Library School will mean a considerable involvement with formal education and training including the involvement in the Centre's work of students. Already two students have been seconded to the Centre to undertake research for a higher degree and it is hoped to attract visiting Fellows to the Centre for varying periods of time.

Advice and consultancy

As a national Centre the staff has an important advisory and consultancy role to fulfil based both on their past experience and the current research programme of the Centre. Although we are happy to give advice at any stage of a research programme, we would prefer to be consulted at the initial stages so that we can view the project as a whole and advise accordingly. In any case, as decisions taken at the early stages of a project have important consequences on the outcome of later stages, advice sought in later stages tends to partake more of 'troubleshooting' than consultation and unsuccessful troubleshooting at that, which does nothing to enhance our reputation!

I mentioned earlier that it is not the Centre's function to undertake the definitive piece of research on any topic and to this end our advisory and research functions combine in that we hope to be associated actively with other people in their research projects, giving advice, help and undertaking as part of the research routine and not acting solely as outside consultants.

To date we have some projects in the pipeline where we will act in this combined advisory–researcher role.

Information

The final important function of the Centre is information, and this interacts with the wider functions particularly as one of the important activities is the building up of the databank and special library. In addition to the data the Centre collects, it is hoped that other researchers will deposit their data as well as their results with the Centre so that we will have situated in one location the data from important user studies. This will make it possible for any researcher to undertake secondary analysis, to compare studies and to undertake explanatory investigations of hypotheses before going to the expense and trouble of setting-up a new research project. For example, in the field of political science several important studies have been published based solely on the secondary analysis of existing data files.

The main concern of the Library of the Centre is the collection of research reports rather than books, with the building-up of a file of references of likely relevance to user studies including a file of current research in progress, library reports and user guides and statistical data of relevance to user studies.

One activity which has taken up much of our time since January 1976 (and which accounts for the low profile we have assumed to date) is the literature review which will form the core of our reference library and be published soon in the form of a selected, evaluative bibliography of user studies. In due course, we will operate a current awareness service and publish occasional papers and information sheets.

The contents of the library and its various data bases will be available for anyone to use either in person or in the form of a postal or telephone enquiry. In the latter case, if the enquiry cannot be answered immediately from one of our publications and takes more than a couple of hours searching, it may be necessary to devise some charging mechanism in order to recoup any costs involved.

So far the Centre has been keeping a low profile as the literature review was a much larger job than originally envisaged and there have been the usual problems and time-consuming tasks of assembling a new staff together and the setting-up of a new organization from scratch. As well as the intellectual exercise involved in defining our operational parameters there have been the mundane but important problems of getting equipment, establishing lines of communication with the various university administration departments in addition to the problems of settling in a new city. However, we are approaching the stage at which we can make our existence more widely known and to become more involved with the information community. Our objective will always be to increase and improve the awareness of the user and thereby to increase the effectiveness of services and the utilization of the information resources both nationally and internationally.

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The information function in relation to user departments: an excursion into the future

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Paper presented at the 50th Aslib Annual Conference, University of Exeter, 20th–23rd September 1976

THE MAJORITY OF endeavours of merit are subject to continuing evolution and development. Although one may not always favour the results of such developments, nevertheless, frequently they transform the impossible of yesterday into the commonplace of today. In these regards the information function is no exception. The advances made to services, sources and systems during the past 25 years have been quite tremendous. There is no reason in fact to expect that the rate of change in the future will be any the less than that which we, or some of us, have experienced.

However, no longer is it realistic to plan or project the future design and organization of the information function solely in terms of technological advance. External factors, such as the desire to improve the quality of life and the hard lessons which have been learned during the course of this latest economic recession, have to be taken into account. Their impact and importance cannot be under-rated.

Through a consideration of these socio-economic factors, and an extrapolation of discernible changes in the art and of advances in technology I will develop a view of how information and library services might be provided by the start of the next millennium.

I have chosen the year 2001 rather than the more popular one of 1984 for two principal reasons. Firstly, I shall attempt to stay out of the realm of science fiction and keep within that of technological feasibility. Secondly, more than 8 years—all that remain to 1984—will be required for my ideas to be realized.

At this point it is appropriate that I insert the normal caveat. The views and opinions which I will put forward are my own. They do not necessarily reflect the official nor the unofficial thinking of my colleagues in ICI.

Organizations to which the design could apply

Prior to developing my arguments in detail, I would like to give an indication of the types of organization in which the design which will emerge could be implemented.

In a word it is *all*. It will have application in both the private and the public sectors, in industry and in non-industrial environments.

Aslib Proceedings, 29 (2), February 1977, p. 77–90. Printed in Great Britain

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As with other activities, experimental and development costs will be high. These will be more readily absorbed by large organizations and, therefore the introduction by these is likely to anticipate a more general acceptance. After all, it is surely axiomatic that what today can be afforded only by the privileged few is tomorrow's norm for the majority? I will allow that some slight modification to particular elements of the design might be needed by some types of organization. I am, however, convinced that the general principles will be of universal application within organizations where there exists 'a need to know'; a need to use information and data.

Factors on which the design is based

For the purpose of this 'excursion into the future' I have chosen to consider three groups of factors.

1. Socio-economic—the consequences of the desire for an improved quality of life at a time when industry is attempting to break down the cycle of economic boom and recession.
2. Developments in the art—the changing nature of staff duties and responsibilities, and the increasing availability of services and sources.
3. Advances in technology—equipment, systems and techniques which are impacting on the information function and industry.

1. Socio-economic factors

I have elected to give top priority to the socio-economic factors. They are those which impose the constraints within which the information formation function will operate, now that the halcyon days in which money was relatively freely available and permission to recruit additional staff fairly easily obtained have passed. They are also those responsible, to a major degree, for the changes which are taking place to the relative importance of types of information.

In the socio-economic area three very closely related elements can be recognized:

(a) Concern for the effective and efficient use of scarce and/or expensive resources.
(b) The economic future and the need to limit unnecessary duplication.
(c) The increasing use of information and data by the decision makers.

However, as these are so finely interrelated—they might be construed as causes and effects—rather than discuss them individually I will treat the topic as a single whole.

Over the immediately passed decade, the adverse economic conditions, which have obtained in the majority of the so called 'developed countries', have brought in their train considerable irreversible changes. These are manifest on the one hand by an awakening of the social conscience and on the other by a growing awareness that industry, the main generator of wealth, needs to improve its profitability.

Thinking people now require that the world's basic wealth—it's people, environment and naturally occurring raw materials—should be used efficiently and effectively for the greatest good. They also require that the general standard of living and quality of life should be subject to continuing improvement. No longer is the uncontrolled desecration of the environment acceptable. Hopefully, never again will we witness disasters of the type and on the scale of the middle-west dust-bowl; disasters directly attributable to man's indiscriminate and unconsidered violation of the environment. To this end, for example, it is now accepted in the UK that accompanying a request for planning permission to open-up new sand or gravel quarries there must be given an undertaking that when further exploitation is no longer economic the land will be either restored for its former use or converted to an area suitable for leisure pursuits.

As to raw materials, one of the reasons put forward by OPEC (the Organization of Petroleum Exporting Countries) for the massive increase to the cost of crude oil was that it would help to control the exploitation of a commodity vital to the petrochemical industry. A consequence of this has been that means suited to mining coal seams, previously thought to be uneconomic, are being developed.

With regard to improvement of the general standard of living and quality of life, gone are the days when the majority of people acquired labour saving devices only when they had amassed sufficient money to pay for them. No longer are such artefacts deemed to be luxuries—they are thought of as essentials for everyday life. In addition, there are the trends towards shorter working weeks, earlier retirement, longer holidays and higher real incomes.

These highly desirable objectives of conservation and improvements to the quality of life represent one side of the coin. It has to be recognized that their achievement will require massive expenditure and that this money has to be earned by the individual, the organization and the country. In bald terms, profitability has to be improved. This is the reverse of the coin.

In attempts to contain escalating costs and to achieve the necessary higher productivity, employers are not only adopting policies which will enable them to take advantage of economies of scale and of technological advance but with salaries and wages constituting a significant component in the total costs they are looking most critically at overhead functions.

The present pattern of use of our information services at Plastics Division is approximately one-third by the Patents Department, one-third by Research Department and one-third by all others, including Production Department and the Works Sites. I would hazard a guess that in the majority of industry which includes an information function, the latter is used heavily by patents and research personnel.

With the changing climate we have to face some unpalatable facts. Patents, research and information activities are overhead functions, albeit that each has a role to play in safeguarding the commercial and long-term prosperity of the organization. Their budgets are often subject at best to nil real growth and at worse to reduction. Increases to establishments are rare indeed. Within these constraints of limited resources the information function is having to provide additional support to its users.

Less than a generation ago it was commonly thought proper to carry out some experimental work rather than to study the literature in order to discover what was already known about the subject. This attitude is now far less prevalent. Unnecessary duplication is frowned upon. And this when scientists and technologists are required to spend an increasing proportion of their time in the laboratory or on the plant. The amount of effort which they are able to devote to keeping up with the literature and undertaking searches of it is reducing. They are having to become reliant on predigested and prepackaged information.

The paradox facing the information function is that its users are pressing for extensions to its services whilst its resources are being increasingly limited.

Appreciation of the value of the information resource is not, however, restricted to scientists and technologists. Its value is also recognized by the decision makers. But they, in addition to having a need for scientific and technical information, require access to many types of unpublished, internally generated information. There are two principal reasons why information needs are becoming more broadly based:

(i) There is a growing awareness that for the long-term prosperity of industry, and hence of the country, the peaks and troughs of the economic cycle must be less high and less deep respectively. A situation which approximates to a steady rate of growth is the goal.

One by-product of the high rate of inflation experienced by most industrial countries, is the extreme expense of launching a new product or process. A fairly immediate and reasonable return on the capital outlay is essential. No longer are technical judgments made solely on the basis of technical merit and of patentability. The trend is to ensure, as far as possible, that the product or process is compatible with others in the existing portfolio and that there is a market for it when it becomes available.

Papers in support of a proposal to initiate work on a new product or process need to demonstrate unambiguously that an adequate market survey has been undertaken and that factors such as the availability of appropriately qualified staff; costs and supplies of the necessary raw materials; safety factors; applicability of existing plant; likely production performance and so on have been taken fully into account. Data of these types are required in addition to state of the art surveys of the published literature.

Such exhaustive and critical appraisals are essential because new ventures can be subsidized for only a short period after they have been launched.

The decision makers also have under regular review the costs of and returns on existing products and processes. For such reviews access to more than the traditional types of information is required.

(ii) The second reason from which stems a need for more broadly based information, is the change taking place in managerial responsibility. Many of the aspects of resource control which previously had been the prerogative of the appropriate functional department now devolve onto the senior executives of, for example, development, engineering and research departments. Such managers are no longer concerned solely with implementing the technical policies of the organization but they are very closely involved in or have complete authority for implementing personnel policies and for total budgetary control within their spheres of influence. Further, they have to ensure that the operations carried out within their departments do not infringe any relevant legislation, such as the Health and Safety at Work Act.

Although the functional experts are vital to any large organization, and will continue so to be, nevertheless information which was previously their prerogative now has to be more widely disseminated.

By way of exemplification, consider some likely information needs of the head of a research department. Being responsible for budgetary control he will need regular financial returns. His will be the prime responsibility for recruiting members of staff, for maintaining the balance of skills necessary to achieve the research targets and objectives and for career development of his staff. He will, therefore, need access to personnel records. He will need to be kept apprised of costs of services, equipment and materials. He needs knowledge of relevant legislation, its requirements and implications. He will be largely responsible for the forward planning of the research function and for this he will need to be aware, among a myriad of other relevant matters, of the period of life remaining to patents owned by the organization and of related work being undertaken elsewhere in the organization.

The various points which I have put forward have, I trust, justified my decision to give priority to the socio-economic factors. They set both the constraints within which the information function will operate over the next decade and of the boundaries to the information function itself. This leads logically to a review of the developments which have taken place in the art of the information function.

2. Developments in the art

In my introductory remarks I indicated that the information function is dynamic—it is subject to evolution and development. The truth of this is demonstrated in part by the changes which have occurred in respect to external, commercially available services and sources, and to the nature of staff duties and responsibilities. A common denominator of both types of change is the volume of published information. Changes to the nature of the work undertaken result additionally from the cut-back in overhead expenditures.

Although there is some difference of opinion among the authorities as to the rate of future expansion of the published literature, that it will continue to increase is not subject to dispute. In absolute terms, the numbers of items to be processed by the turn of the century will be legion compared with those of today. Recognition of the fact that a necessary aid in limiting unnecessary duplication is the adequate recording of both successful and unsuccessful work in a form suited for retrospective search, and of the need to make local information more widely available than it has been hitherto, will result in a corresponding expansion to the amount of unpublished, internally generated information which has to be organized and processed.

In the area of published information there has long been an established and largely satisfied need for aids to its use. The printed secondary service has been in existence throughout the whole of this century. More recently machine-readable editions of certain major data bases have been marketed, data bases tailored to the needs of particular sectors are becoming more readily available and macroprofiles covering specialized topics can be purchased. There is a steady trade in processing aids—software packages suited for in-house use, the MARC tapes and so forth. And where would we be without the British Library Lending Division (BLLD)?

The sheer volume of the published literature, aggravated by the changes to patent procedures in a number of important commercial and patent-granting countries, has opened the door to the purveyors of services and sources. The information industry has blossomed virtually overnight! This increase in the amount of published information is particularly noticeable in respect of the newer technologies. For example, little information of merit relating to the synthetic polymer and plastics industry was published before the Second World War. The present doubling cycle for publications in this area is substantially less than that for chemistry as a whole. This is a contributory factor to changes to the duties of information staff working in that particular industry. The emphasis of their work is moving away from that of being mainly concerned with processing the published literature and towards a greater involvement in its use. For the immediate future, however, not all members of staff can be so concerned. Processing of internally generated information has to be carried out.

However, increasing numbers of staff are now becoming specialists in the information of a particular business area. The need for such specialists is being accelerated by the fact that users have less time to devote to the information aspect of their work whilst simultaneously their information needs are increasing. And so the wheel turns full circle for this situation opens up the market even more to the purveyors of services and sources.

Thanks largely to the existence of the BLLD, the library fraternity has to a major extent been cushioned from the worst effects of the limitations placed on resources. Changes to the nature of their work have been minimal. What is changing is the way in which much of the library routine is effected.

In both information units and libraries, the computer age is making a very real impact. Many clerical operations and some intellectual ones have now been taken over by one or other of the available black boxes.

3. Advances in technology

The advances which have taken place in that technology having application to the information function within the span of little more than a generation are quite tremendous and further developments expected to reach fruition in the not too distant future are most exciting. To do full justice to this topic would require several papers, I can do little more than indicate what is happening.

It was only about 10 years ago that we at Plastics Division began to use the computer for information retrieval, some 10 years after computers began to make any impact as business aids. At that time installations were cumbersome and required massive air conditioning plant, capacities were relatively small and computers and computing could be afforded only by large organizations.

Today, computers come in all shapes and sizes and at prices to suit all pockets.

Capacities of main-frame machines have increased substantially and computing unit costs have dropped dramatically. New storage media are under development and these will result in even more streamlined and higher capacity installations.

The impact of the minicomputer is, in its sphere, likely to be as great as that made by the BMC Minis when they were introduced. The microcomputer is already somewhat more than a dream in the eye of the designers. The purchase price of a fairly powerful minicomputer, suited to processing medium-sized files, is within the budget of the vast majority of organizations. Computing is no longer a luxury for the favoured few.

With regard to peripheral equipment, the situation parallels that of the computer. Particularly notable are the advances made in respect of devices and techniques for data preparation.

One is no longer restricted to the eighty-column card—beloved as these are of data preparation units. There is now a variety of word processors which allow for the generation of data on paper or magnetic tapes and the more sophisticated of which allow for data to be keyed directly into a computer. Optical character recognition is well established, although presently limited to certain type founts. Experimentation into the possibilities of voice and hand-writing recognition is in progress. Computer input microfilm (CIM) and plotters, although not yet in general use, have great potential as input devices for data not in linear form such as chemical structures and engineering drawings.

Computer-assisted typesetting is now accepted in the printing industry. It has utility both on the commercial scale and for in-house operation. A well-known example of the former is its use in the preparation of *Chemical Abstracts*. Within ICI it is used by the Corporate Information Unit for certain of its current awareness bulletins.

Output can be in a variety of modes. From the 'traditional' printed page obtained from computer typesetting, through computer output microfilm (COM) to all upper case output on pyjama paper from the line printer. Output can also be to a terminal.

Data transmission, machine talking to machine, is an everyday affair. Distances over which data can be transmitted range from a few yards—a word processor coupled to an adjacent computer and used for input and editing routines—to intercontinental traffic using carrier networks such as TYMSHARE. Coming onto the market are services and systems which will require for reception only a slightly modified standard television receiver. CEEFAX, ORACLE and VIEWDATA are examples of these.

For full document storage, the use of microform is well established. The range of viewing equipment is now such that most needs can be satisfied. At one end of the spectrum are the small, portable viewers and at the other sophisticated devices exemplified by the Marconi 'Automated Ultrafiche Terminal'.

Corresponding to the developments taking place in respect of hardware, much effort is being devoted to systems. A considerable amount of the current work is directed towards providing more efficient means for controlling the printed word in order to maximize recall and, hopefully, relevance—studies concerned with 'automatic' indexing, synonym control, multilingual thesauri and the like.

In addition to this basic work, a number of research teams are attempting to unravel the mysteries of the nature and structure of language by the application of techniques well proven in the physical sciences. Studies such as these may well provide the break-through needed for truly automatic indexing and computerized translation to be realized.

With regard to libraries, systems are now available which allow for automation of many of the basic tasks. Certain of the routines are little more than direct replacements of manual operations; others make viable, services which previously were very time consuming operations. Union lists and catalogues; control of orders, stock and circulations; loans systems and cataloguing; all can be grist to the computer mill.

Summary

I have discussed in some detail three groups of factors which are of major importance when one attempts to make a forecast of what the future style of the information function might be and how this would relate to user departments.

The socio-economic factors—those factors concerned with the generation of the new real wealth necessary if certain socially desirable objectives are to be attained. In that these give rise to the constraints within which the information function has to operate now and in the future, they can be construed as a primary cause from which discernible changes to the function stem.

Developments in the art—the increasing availability of external services and sources, and the shift of emphasis in the nature of the work of those involved in the processing and manipulation of information. In like vein, these developments may be thought of as effects following from the causes.

Advances in technology—more sophisticated equipment, systems and techniques. These not only take much of the art away from the information function and replace it by science, but provide means by which change can take place less painfully both to providers and users of information.

Use of the terms 'cause' and 'effect' implies that there has been change.

My thesis is that there have already been very recognizable changes, that the impetus of change will increase and that by a logical extrapolation from the present changes one can deduce a possible, if not an acceptable probable design which will allow for information needs to be realized more efficiently and effectively in the future.

I would now like to attempt answers to two questions: 'what has so far been achieved?' and 'how much further could one go?'

The present state of the art

In addressing attention to the first of these questions, 'what has so far been achieved?'—what is the present state of the art?—initial consideration must surely be given to the changes which have occurred to the content of the information function itself. That is, the elements which together now make up the total function. I suggest that these elements are many.

Going back to antiquity there were collections of tablets of stone. These were followed by illuminated hand-inscribed manuscripts, the printed word, books, monastic libraries, academic libraries, learned society libraries, public libraries, industrial libraries, information units, reports centres until today is reached.

Today, I would suggest, the information function has to be construed as encompassing far more than the library, the information unit and the reports centre. It must be taken, at the very least, to include all who are involved in the systematic organization, processing and handling of information and data. Typically, it must include the correspondence registry function and units concerned with plant and production records, supply and distribution data, sales and performance statistics, market research, engineering drawings, safety information, patents formalities, physico-chemical property data, personnel records. The broadening of the information requirement base makes this so.

This perhaps somewhat controversial fact is gaining acceptance by managements and staff of the various component parts. They are coming to appreciate that in respect of decision making, information can for little longer be deemed to be divisable. All relevant information must be made available when it is required.

For a number of reasons—tradition, lack of resources, a reluctance to accept change—it is still thought necessary for differing approaches and systems to be used for the various categories of information. But gradually these are being overcome. There is now an appreciable degree of interaction between those responsible for or working in the different sectors. Areas in which co-operation is possible are being actively sought; there is joint evaluation of new systems and techniques; in some instances units are merging with one another. Whilst the prime motivation may well be the need for optimization of scarce and expensive resources, the objective must be an improved service to the user.

To this same end, the role of many information officers is changing. In ICI and elsewhere, both within industry and outside of it, certain members of the information staff are becoming expert in the information of specific areas and provide a service to particular groups of the total population of users. The extent to which the potential of this approach has been realized is variable. Some merely provide the 'basic' information service; others are more closely involved with their users. These latter are party to discussions related to both on-going and projected work, and they may also carry out assessment and interpretation of the literature. That is, they perform an intelligence function rather than the more prescribed information role. In order to attain this degree of acceptance, that of being a peer, they need to possess a level of technical or professional knowledge approaching that of their users in addition to having information skills.

Presently, the majority of those who are undertaking the duties of the specialist information officer or information liaison officer are drawn from the establishment of the information function. With the emphasis of their work being directed to use of the information resource, they are, in general, unable to make more than a minimal contribution to the background tasks associated with data base compilation. At the same time more internally generated information requires organizing and processing—work which, because of the confidential nature of the information, can only be undertaken in-house. Over and above this there is the increasing volume of relevant published information to be coped with.

In order to make staff available for the specialist role and to accommodate the work associated with internally generated information, more recourse is being made to commercially available external services and sources. Inexorably we are being forced into a position of almost total reliance on the secondary services for the provision of current awareness and retrieval services to the published literature.

In-house compiled bulletins are being phased out in favour of SDI, either bought in or generated locally from purchased or leased computerized data bases. There is far less intellectual re-indexing of the external literature. If any re-indexing is needed the trend is for this to be derived by the use of systems which allow for machine transfer of data and for the data to be processed via semi-automatic indexing routines. External data bases are being used increasingly for retrospective search, most particularly in the on-line mode. Inherent in this acceptance that an increasingly adequate service to the published literature can be obtained from the secondary services, is a recognition of the fact that in-house processing of such literature represents unnecessary duplication of effort. This attitude is now being paralleled by the publishers of secondary services themselves. A number of co-operative schemes are in existence which allow for the sharing of abstracting and, in some cases, that of input preparation for data base generation.

Publishers of both primary and secondary sources are being forced by escalating costs and pressures from the market place—the latter manifest in the main by the severe budgetary constraints which subscribers have to face—publishers are being forced into rationalizing their procedures. The market no longer supports, particularly in the area of secondary services, a variety of publications covering virtually identical subject matter. Of three major abstracting services covering chemistry which were in existence in the year when ICI was founded, only *Chemical Abstracts* has survived. In the 25 years life of Derwent Publications Limited no comparable service to that of Derwent's has emerged to cover the increasingly important field of patent literature. An appreciable amount of the input required for the specialist data bases is obtained from houses publishing more comprehensive ones.

Production cycles are being streamlined by the introduction of modern technology—word processors, computer-assisted typesetting, COM and the like. From one input operation a single master file is created from which most, and in some instances all, of the required outputs can be obtained by machine selection and combination of the relevant data elements.

Such advances are not being implemented only by the publishing houses. They are being applied to the generation and processing of internally generated information. Much of this information is now recorded from initiation in machine-readable form. Correlations which previously had been very time consuming operations, if not impossibilities, can be done at the flick of a computer switch. And again this is being done increasingly in the on-line mode.

The impact which the computer has made to library operations, as evidenced by the volume of literature on the subject, is quite overwhelming. Most of the day-to-day clerical routines and a number of the professional aspects have been successfully computerized.

Over the course of little more than a decade quite tremendous strides have been made to the manners in which information is generated, processed, stored and disseminated. But development has not stood still whilst these new techniques have been evaluated and implemented in operational environments. It is from these as yet unexploited developments and from established trends that I will develop my view of what the information function may be in the future. That is, I will give an answer to the second of the questions which I posed earlier—'how much further could one go?'

A possible design for the future

Thus far in this paper, I have attempted to give some precedence, in the component parts, to the human resource—the consequences arising from people's desire for a better life, changes which have occurred to their roles in the information function and so forth. I have treated equipment, systems and techniques strictly as tools of the trade. However, in this penultimate section I propose to reverse the order.

To date, technology in its broadest context has provided the means which have allowed the information function to evolve slowly and surely to meet user needs reasonably efficiently and effectively during periods of boom and economic constraint. Technology has been the servant of those providing the service and, in general terms, the organization of the function and the elements of the service which it has in the past provided and still continues to provide have remained largely in the traditional mould. However, as in so many other areas of endeavour, the signs are such that in the future technology will play a more dominant role and may well be the determining factor opposite the nature of the information function. So, how may information needs be met in the year 2001?

Consider how a piece of new knowledge could be translated into a resource for those having the need to know. Using present day categorizations, the new knowledge could equally well be scientific or technical; techno-commercial or commercial; management; published or internally generated and confidential to the originating organization.

The new knowledge will be recorded only in machine-readable form. If such are still in existence, word processors will be used to generate the input either on a magnetic tape cassette, key it directly into a computer or prepare it for OCR processing. However, it is more possible that the author will either dictate to a peripheral for voice recognition processing or his manuscript will be fed to a hand-writing recognition device. Elements other than text will be input by CIM routines, plotters or their successors. On the commercial scale, computer-assisted typesetting will be the norm.

Having achieved the required break through from the present studies into the structure and nature of language, indexing, correlations, subject analysis and assignment to the appropriate files, and like processing operations will be carried out automatically within the machine. Further, abstracting, indexing and cataloguing of an item will be carried out once only.

Hard copy will disappear. The complete text, with its various elements—author, title, abstract, text, diagrams—readily identifiable will be stored in forms suitable for transmission in whole or in part by facsimile, over telecommunication networks or via systems such as CEEFAX, ORACLE and VIEWDATA. Additionally it will be available as or convertible by the user to microform. Storage will be at local, national or international centres depending upon the nature of the information and the elements which it comprises.

In respect of the published literature one can envisage national collections of complete documents organized on subject matter and type bases. 'Copy' of these would be obtained by telefacsimile or as microform. The associated abstracts and indexes to these would be compiled into data bases and held at international centres for interrogation via telecommunication networks. Data would be held nationally or internationally and would be available either via systems such as CEEFAX or over the telecommunication networks.

Unpublished, internally generated confidential information would be stored locally, including corporately, and would be available on-line.

Access to these files for either current awareness or retrospective search will be via a console which incorporates, *inter alia,* transmitting and/or receiving stations into or for telecommunication networks, CEEFAX and the like, facsimile, and microform stores.

Within the processing cycle from the point of generation of new knowledge to the stage at which it becomes available for use there is only limited human involvement—the author of the knowledge and the systems experts responsible for the equipment on which it is to be processed. The machine has taken over all of the routine of selection, abstracting, indexing and cataloguing previously done by professional information officers and librarians.

The steadily growing range of commercially available specialist subject-oriented current awareness services in hard-copy form sounded the knell for the in-house bulletin. Its departure has been hastened by the machine-readable data bases and will undoubtedly be completed when the full potential of the on-line services can be realized. This latter will require that all elements needed by the user are included in the files. In certain areas the utility of the external data bases would be greatly enhanced by the inclusion of abstracts, chemical formulae, engineering drawings and so forth. As computer capacities increase and the appropriate peripheral equipment is developed these enhancements will surely come. With this as a reality, on-line access to the information that he needs will be only a telephone connection away from the user. This being so, the user will be self-reliant for current awareness.

This leaves but search and its related aspect—the use of information. When the full potential of the on-line mode can be realized, many of the searches which at present are satisfied by a perusal of appropriate sources in the library will be carried out on-line. Typically these are the 'half a dozen good recent references' type search; 'who owns this trade mark and what does it cover'; 'how much of product X did company Y make in year Z'; 'what is the boiling point of A'. Instead of phoning the library for this type of information, the enquirer will dial up the appropriate file from his terminal.

For comprehensive retrospective search and in seeking answers to complex problems there will, I believe, remain a place for an intermediary between the enquirer and the information which can satisfy his need. There are three closely related reasons which lead me to this conclusion. Devolution of the decision-making process and the involvement of more people in it; the broadening base of the information requirement—the need for more types of information by decision makers; and the increasing volume of information. For these reasons there will be a need for the information to be evaluated and interpreted—for an intelligence function to be performed on the information before it is presented to the user.

This major change to the role of the intermediary sets the specification to the qualifications he must possess.

Within his own environment he must be recognized as an equal. Outside of it he needs to be accepted as an expert. His detailed training, qualifications and experience need to be firmly rooted in his own profession and not in that of information science or librarianship.

With all of the processing becoming a machine operation, the disappearance of hard copy and the establishment of national and international collections of complete texts, the availability of computerized data bases to all knowledge, user self-help in respect of current awareness and 'minor' enquiries, and expert support with regard to comprehensive retrospective search there would seem to be few long-term prospects for those qualified only in information science or librarianship.

Aided and abetted by technological advance the wheel would turn full circle. The information function of the future will return to where it was before information units and libraries were established. It will be within the user departments.

Conclusion

In response to both external and internal pressures there have been material changes to the information function, particularly within the large organizations.

1. The base of the function is being broadened. No longer can information needs be satisfied solely by reference to the sources which have been the prerogative of the traditional information unit and library. In support of the decision-making process these have to be supplemented by all types of management information.

2. This in its turn has had an effect on the role of the professional information officer and librarian. The trend is for these to become specialists in the information resources of specific business or subject areas.

3. In order to respond to the increased demands being made on the information function in these times of severe budgetary constraint, greater reliance is being placed upon external services and sources, and advantage taken of technological advance.

4. It is assumed that the pressures and the arising discernible trends will continue and that technology will become the dominant factor in shaping the information function of the future and in determining where it will be located. On this basis the conclusion reached is that it will be integrated with the user departments in which there exists 'a need to know'.

The use of national resources to encourage the more effective use of information by industry

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Paper presented at the Aslib 50th Annual Conference, University of Exeter, 20th–23rd September 1976

IN BEING PRESENTED with the title of this paper by Aslib, it seemed to me that I was in effect being posed two questions:

> First, is it possible to develop a theory of information in which there is both justification and theoretical base for a national information service supported by public funds?
> Secondly, what are the practical operational features of a service founded on such a theoretical basis?

In some ways, this is a task more difficult before an audience of information specialists than it would be before an audience of economists or students of change and innovation. The change in attitudes required by the theory may be more demanding of professional information workers (and therefore more threatening) than it would be of economists.

Traditionally, information workers have been concerned to develop stores of documents, to develop systems of access to these stores by identification of documents through subject, author or other characteristics, to bring the documents or the contents to the notice of potentially interested persons through various types of current awareness and retrospective review, or by providing data enquiry services based on document collections. By and large, this has been the world of information composed of an establishment of librarians, documentalists, information scientists and information officers. There were other workers at what have been considered the outer fringes of information such as agricultural extension workers, but these have somehow never been accepted into the establishment which has remained document based, and it has remained secure in its document base.

Documents do contain the main mass of the world's knowledge and information in its most exact state. Documents have a recognized place in the scientific cycle of generation, publication and further generation of knowledge, and in this context publication includes dissemination and storage of knowledge. Not unnaturally, therefore, the literature of librarianship and information science continually refers to the needs of research and of research workers. There has

Aslib Proceedings, 29 (2), February 1977, p. 91–103. Printed in Great Britain

been a virtual assumption that the ultimate use of information is research, and information activities have been seen as part of the scientific cycle and in effect, therefore, as subservient to scientific activities.

The increase in the output of science, and following that of technology, has led to a vast increase in numbers of publication, in size and numbers of libraries, in the range of systems for coping with the problem of mass, and therefore in the resources of men and finance devoted to these activities. But a querulousness has undoubtedly arisen as to the validity of devoting such large resources to these activities, a querulousness which is paralleled and perhaps stimulated by that which is now being raised as to the concept of science policy and to investment in science. Are the traditional concepts of science and information relevant? Are they relevant to the objectives of society and to the various productive and social units of society such as business firms and governmental agencies as these now exist?

Economists have become aware of a shift in the economies of the developed world, a shift caused by what is termed the information revolution, and their awareness has been stimulated by a dissatisfaction with conventional economic theories based on statistical probabilities and assumptions of perfect knowledge. The conditions of uncertainty surrounding any decision to adopt a new policy and the prognostication as to the outcome of the decision stem from the reality of very imperfect knowledge.

Also the essence of the decision situation is that it is unique and therefore not amenable to a statistical probability theorem. The search for theories more appropriate to modern economies has identified a growth of very large knowledge industries. These knowledge industries include education, research, publishing, communication technologies, broadcasting and of course information services as we understand them. The growth of this knowledge/information sector of developed economies has been taking place slowly, almost imperceptibly, but exponentially for a good many years. Machlup[1] estimated in 1961 that the knowledge industry's share of the US gross national product in 1958 might be as high as 29 per cent. In extrapolating in 1968 he thought it might reach 40 per cent. More recently, in a paper delivered in 1975, Parker[2] estimated that by 1975 50 per cent of the US labour force would be engaged in information processing occupations. By being more conservative in his definitions, he could defer the 50 per cent point only to 1980. Whichever it is, a major change has occurred in the basic structure of the US economy since 1950 when industrial occupation represented 50 per cent of the labour force. The point is illustrated in Figure 1. He gave as another indicator of change, the increase in the amount of personal expenditure in the US devoted to knowledge goods and services, such as books, TV, phones and counselling services—an increase of 39 per cent in the 21 years 1950–71.

There is a basic need to know of such proportions that the main economic activities of modern society, that is the activities to which a major portion of a nation's resources are devoted, are those of enquiring, communicating and deciding.[3] Though not yet directly measured, these changes are also evident in more modest economies such as the Irish.

Society has progressed from the low productivity agricultural society through

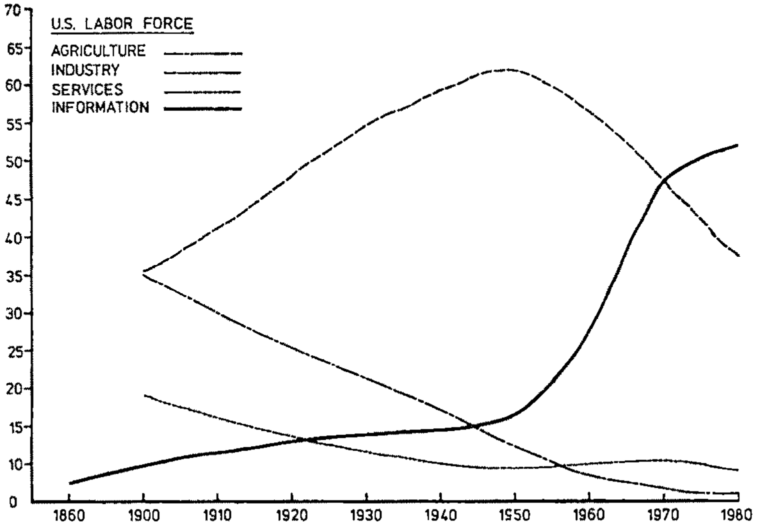

FIG. 1. *US labour force: four-sector aggregation*

the more highly productive industrial society to a knowledge society of very high productivity and considerable leisure, and this progression has seen man moving from being a motive and manipulative force to being an evaluative, communicating and decision-making force. The evaluative, communication and decision-making force has always been present within the productive, that is agricultural and industrial organizations, and within other units of society. Gradually, at first very slowly, the productive units in particular have become or are becoming primarily learning systems[4] rather than production systems, receiving new knowledge, by adapting to the new knowledge, and introducing change. The paramount objective in learning and in change has been to create new wealth, to bring about economic and social improvement and through these gain power. Where a society or organization has refused to learn and adapt, it has declined and died. Empires have fragmented and business gone into liquidation because they held to their traditional structure.

The main factor in change and in the creation of wealth, and in the shift from the low productivity agricultural society to the high productivity industrial society, has been what is termed technical progress.[5] Technical progress consists of two components: innovation *per se*, the first application of some aspect of scientific knowledge with economic success, and the adoption of the best technical practices. Both include management and other techniques as well as technical production processes or products. Both are intrinsically concerned with acquiring and evaluating existing knowledge in the light of other knowledge such as of sources of materials and energy and of markets. However, the main stimulus to growth and change has been the growth in scientific knowledge.

Undoubtedly, it was the realization of the role of scientific knowledge in economic development which led to the formulation of the science policy concept, and to the heavy investment during the post-Second World War decades in research and in scientific institutes. Research was seen as a short-cut to national objectives of greater prosperity and an improved standard and quality of life.[6] The formulation of the concept was, however, too late because the implementation of the policies was done through the traditional structures of science. The theory fitted well the past growth but was already not fitted to the evolution of the productive units of the late industrial society, industrial firms, as being primarily learning system. Times have been changing. Innovation and economic growth have been seen to have been based on the identification and acquisition of useful knowledge rather than on the generation of new knowledge. Japan and Germany have both provided examples of buying in the best technical practice, of identifying quickly new knowledge capable of innovative application, and of thus achieving economic growth without heavy investment in research. Robertson[7] adapted Table 1 from Freeman.[8] A subjective rating and Robertson said that it looked as though the most progressive firms, those adopting an offensive strategy, put less effort into their STI systems, but that in fact they put twice as much effort into research as others. However, he understated the reality by concluding: 'In other words, STI is generated in-house.'

STRATEGY	*Scientific and technical information (STI)*
Offensive	4
Defensive	5
Imitative	5
Dependent	3
Traditional	1
Opportunist	5

Note: STI rated on a five-point scale.

TABLE 1: *Strategies of the firm related to intensity of STI usage.*

A Swedish company has estimated that the ratio of existing knowledge to new knowledge in a new product was 98:2, the 2 per cent being generated by its own R & D effort.[9] A very small percentage, but having its own R & D department gave the firm the ability to assess and utilize information, that is not to generate it. Studies of technically progressive firms beginning with the now quite old Carter and Williams study[10] and including the more recent Sappho project[11] have highlighted the knowledge and information factors. Successful performance has been characterized by outward-going searches for the best technical practices and specific data on market needs, by strong communication links to sources of specifically relevant knowledge, by maintenance of capabilities and practices for evaluation and by effective decision making as the ultimate key element.

Decision making is the key element of change. It has been described[12] as the focal, creative psychic event, where knowledge, thought, feeling and imagination are fused into action'. Through decision, knowledge and information are translated into creative and productive activity. Change is brought about within the industrial company and, by the diffusion of its innovation through its markets, change is brought about in society. Through many simultaneous changes there is instability in society in the sense that the environment in which a business firm exists is dynamic.

A business decision is based on opinions regarding the future. The expectation is that the innovation or change will bring about optimum benefits in the form of wealth created, turnover and profits. This outcome, however, is most uncertain since these benefits will only accrue in the future. The opinion is formed on the basis of past experience, the existing stock of knowledge, and the flow of information, but living in a complex and changing world, knowledge rapidly becomes obsolete and new knowledge and information are required to supplement the old. The extent to which a decision achieves or exceeds expectations is dependent on the quality of the knowledge held and information acquired and on the relevance of the information acquired to the specific problem.

From user studies carried out in our own field, we have some measure of these knowledge and information processes in operation. A high proportion of the time of scientists and engineers is spent on acquiring information. In Canada it was 15–20 per cent,[13] in Britain 20 per cent of the time of design draughtsmen,[14] in the US 16 hours a week by industrial chemists.[15] We know also that input of high quality journals, attendance at conferences and active informal communication accompany apparently successful projects. Industrial scientists are said to spend more time in total information/communication activities than academic scientists. As much as 70 per cent of their time may be spent thus.[16] These specific details confirm the more generalized theories on the economics of information and knowledge now being evolved by economists.

It is the realization of the business firm as a learning system that has led economists such as Shackle[17] to attempt to redefine the theory of the firm in terms of knowledge. He defined the objective of the business firm as the pursuit of knowledge and not the pursuit of profit. Profit is the measure of success in the pursuit of knowledge. This pursuit encompasses research, education and training, recruitment of new personnel, market research, reading the newspaper, management information systems, library and documentation services, chance encounters, know-how agreements and so on. All these are processes for acquiring and evaluating information existing in a network of external and internal communication centred on the decision-making function. The network, however, is not a stable one in some of its parts because the external environment is not stable being subject to change. Each decision is unique in its circumstances. It requires its own unique inputs and, therefore communication with specifically relevant sources for these inputs.

We can now begin to discern why the science policy concept, in the mode of its implementation in investment in research in universities and institutes, has not produced the expected returns in economic growth. The academic scientist lives and works in a closed-loop system. This system has, as its objectives, generation of knowledge and communication of that knowledge in order to stimulate the generation of further knowledge. Unlike the industrial scientist, the academic is not integrated into a learning and evaluating system which has decision for productive change as its objective. The phenomenon has been highlighted[18] in many developing countries, where university and research institute personnel have failed to create the hoped-for input into local industrial and economic development, but are successfully linked into the international science system. Investment has been in the traditional structures. Similar comment can be made of our libraries and information systems albeit that they have adopted or developed new technologies—but within the established structure. Dr de Solla Price was perhaps historically correct when he said[19] that 'science and technology progress quite independently of one another, with their communications limited to that which occurs during the education process'. This may once have been a correct hypothesis, it may still be correct in regard to most of the science system, but it is no longer true of much of the technological business system. The business system in its more progressive sections has taken the initiative and forged the communication links to sources of specialist expertise in the science system.

These and other links have a particular characteristic. They operate most effectively on a person-to-person basis. There have been many studies, usually highly specific, which have demonstrated this. The concept of the technological gatekeeper or rather communication star, the heavy reliance by many firms on the suppliers representative, the direct personal links between a firm and external specifically relevant expertise in a university or institute, the outstanding success in the early part of this century of the US Agricultural Extension Service, all these are examples of the human characteristic to prefer person-to-person communication. Myers and Marquis[20] emphasized the importance of personal contact external to the firm for both idea generation and problem solving.

We can see that the business firm really is a learning system and that it survives through its success in effectively operating as a learning system. If it fails in this, it loses its markets, becomes bankrupt and goes out of existence. The pressures on it to evolve are real and immediate, and are reinforced through demands for further creation of wealth for social investment and for more sophisticated solutions to problems. The demands come from government and from people who want improvement in both the quality and standard of life. In order to meet the demands, industry requires further inputs of knowledge and information, and for these inputs depends on sources and an infrastructure which are outside of its decision control or influence.

These sources and infrastructure lie within sectors of society under government influence or control and consist of the scientific and technological, education and training, communications and publication and other sectors. The pressures to change on government agencies and on the different organizations within these sectors are not so immediate as those on the industrial company. They will not go out of existence if they do not adapt. Reaction to pressure is often defensive even when intended to be progressive. Resources are devoted to increasing the capacity of the source of the input of knowledge or reforming its internal structure. The result is reinforcement of the existing structure. Thus the organizations within the sectors providing the major inputs lag behind in their own evolution as learning systems and their effectiveness in contributing to national objectives of economic growth and social improvement is much diminished.

The key to their future effectiveness lies in their integration as evolved learning systems in the larger knowledge society, learning systems which have as their major activities enquiring, communicating and evaluating for decision making. They themselves may not be the ultimate decision maker, but integration in the knowledge society means direct linking to the decision maker whose activity is to transform the knowledge and information into action.

As a first step towards this integration, there needs to be a wider appreciation and understanding of the fundamental dynamics of the knowledge society. Hence the search for more satisfactory economic theories in terms of knowledge and information and my own belief that *a theory of information must be formulated.*

The factors to be considered

. the knowledge society has evolved as a dynamic society
. the main factor in change is technology
. the main agent for technology is the business firm
. the business firm achieves success through its pursuit of knowledge
. the knowledge is available from a complex infrastructure of sources
. the main economic activities of the knowledge society and of its economic units and knowledge sources are those of enquiring, communicating and deciding (communicating being understood to include evaluating)
. but being human societies, communication is highly dependent on person-to-person contact.

These can be summarized in the following simple statement:

> Each unit in society whether industrial firm, government department, research or educational institute, welfare agency or other unit, is a system achieving its objective of implementing creative or productive change through decision fed by a network of communication and evaluation links to sources of knowledge and information specifically relevant to the unique decision environment.

In seeking now to examine how this theory might be implemented in practice, let us first look at the knowledge and information inputs required by an industrial firm as the central agent of change. These inputs are:

. high quality of knowledge of personnel recruited
. updating of this knowledge
. data on user/consumer needs
. market infrastructure data: tariffs, transport, population characteristics, competition, etc.
. new process technology: machinery, production and packaging systems
. new product technology: materials, sub-components, design data, standards
. management information: costs, production, sales
. monitoring techniques: quality control, maintenance
. management techniques: decision analysis, operation research.

The sources of this knowledge and information are equally varied:

. the educational and training system
. the research and technical system, universities, institutes, laboratories
. libraries and information centres
. the market
. the government and its agencies
. internal data generation processes, computer and other data stores
. competing and supplying organizations.

The media by which the knowledge and information are evaluated and communicated are:

. internal reports and documents
. internal meetings, discussion with colleagues
. meetings and other forms of personal contact with scientists, suppliers, civil servants and other experts
. courses, conferences and training programmes
. public media: newspapers, journals, radio and TV, telecommunication links
. enquiry services, such as consultancy, information services, research projects.

There is a duplication in these lists because we are dealing with three activities:

. enquiring through research and data collection of one kind or another
. communicating through personal contact, publication or transmission
. evaluating through those with expert or relevant knowledge.

The industrial firm engages in these activities to develop the 'terrain'[21] of its knowledge—its resources in know-how, manpower, finance, equipment, markets, etc., and to enhance the flow of information reaching it, information either of problems for which an answer has to be provided or of solutions as to how a present or future problem can be solved. The problem for the firm is to develop its 'terrain' through its internal sources and media of enquiry, evaluation and communication. Then it must reach out to information, and the progressive firm does this by activating its external communication links.

The problem for government is to activate the communication links of the infrastructure and of the sources of knowledge and information. Feedback is required so that these sources contain the knowledge and information appropriate to real and defined needs. Response to the industrial communication can then be effective in its relevance, and the outward communication links from the sources can be realistically activated. Similarly, much of industry can be stimulated to be as active as the more progressive firms. The whole of society then becomes more dynamic, adopting change and adapting to it, each sector actively linked into the other. This is the essence of the knowledge society.

The key element is communication and the function of a national information system is to activate the communication links to and from industry, the key agents of change, and provide itself some of the media of communication. It can only do this effectively if there is a higher agency under which it operates and whose function is the maintenance of the knowledge and communication systems and infrastructure. In other words, a national knowledge and communications resource administration agency or department is required to co-ordinate and develop the sources according to the changing needs and ensure outward and inward links. Historically our economies at national and industrial level have structured themselves around the financial inputs and outputs. The major inputs and outputs are now knowledge and information, and, therefore, such a resource administration is perhaps now much more essential than a Ministry of Finance. Furthermore such an administration is required in order to effect institutional changes which may be necessary in the knowledge society.

Creation of such an administration is still a long way off in most countries. In Ireland, after a decade of discussion, a Bill has been introduced in the Irish Parliament to create a National Board for Science and Technology. It will have responsibility for the national science budget, it will be able to propose new structures, and it will co-ordinate the main research institutes and technical activities of the state. Its responsibilities will be restricted to one broad sector of the total knowledge system, but since this is the key sector, the restriction at this stage should not be harmful. It is difficult to know at this stage what influence it will have on research activity in universities. This could be more serious, since this affects not only the know-how available from university staff directly but also that of graduates recruited by industry. However, it is a first positive step, and it provides an example of how change might be effected.

One of the institutes for which the NBST will have responsibility is the Institute for Industrial Research and Standards, of which my own organization is a division. IIRS was established as a main source of science and technology for industry, and since 1961 has been expanding and developing as this source through technical consultancy, investigation and research—in that order.

My own role commenced in 1965 in taking charge of a very small Technical Information Department. Now it is a large division providing a national information service to industry in science and technology I do not propose to describe its various services, but only to use two examples from our experience to illustrate how one information organization is attempting to become effective in activating communication links in the knowledge society or in influencing change in the infrastructure. Very early, we took the decision not to develop an equivalent of the British Lending Library for Science and Technology. The function to which we should devote our limited resources was that of identifying analysing and disseminating the information in documents and of ensuring that mechanisms existed for the acquisition of documents. The provision of the basic store was not our function. There were other large stores within the state and of course there was the British National Lending Library for Science and Technology without whose service we would have been in dire straits. However, there was the need to create a national network of the major libraries in order to develop a store nationally accessible for rapid delivery of documents. The existing large stores were virtually all in the higher education sector, that is university libraries and the inter-library lending system was funded by the

Department of Local Government for the public library sector. Hence there were very real institutional problems. These libraries were funded and maintained for university staff and students. There was still a low demand for documents and a low awareness of the need to increase demand and access to documents. A first attempt to bring together the various interests inevitably failed.

The solution lay through the mechanism of the National Science Council, a body created as an interim stage in the progress towards the NBST. It was agreed that major surveys[22] be undertaken of all existing services and resources devoted to Scientific and Technical Information and of current pattern of acquisition of information by users in industry, government and higher education from all types of sources. This provided the further opportunity to invite OECD through its Information Policy Group to carry out a review of STI policy in Ireland. The objective of this programme was of course to create an awareness of wider needs than solely those for documents. The surveys became the basis for this review.[23] *Inter alia* the OECD recommended the[24] establishment under a future NBST, itself a recommendation of the concurrent Science Policy Review, of a Documentation Co-ordination Committee. This was set up 2 years ago and is now engaged on a number of information gathering projects prior to the formulation of its recommendations on setting up a national documentation network. It is now creating yet further awareness of needs and is undoubtedly receiving co-operation from librarians.

In all of this development, one can see the need for the major institutional, co-ordinating and funding agency. The role of the national industrial information service in activating feedback and communication from users and to the agency and sources was an essential catalyst.

The major task of the service is that of activating the communication links of industry with all sources, not only documentary. The major sources are the staff and laboratories of IIRS. The function of the Technical Information Division was initially to do this through its enquiry service which acts as a referral service as well as giving direct replies, and through more general promotional activities such as publications, press publicity, exhibitions, courses and conferences. These were valid activities but not sufficiently direct.

A technical liaison service was established. The kind of thinking about this which we had then and have now are very different. There have been mistakes and disappointments and we have still to attain a wider acceptance of the philosophy and of a fully effective level of operation. However, experience and contact with research in several countries has evolved a philosophy well fitted to the concept of the knowledge society.

Basic to the philosophy is the role of person-to-person communication as the primary level of communication. The first function of this liaison service is to visit industrial firms making contact at a top management level and at senior technical levels, that is with the decision makers. Through this contact, a personal relationship can be developed. Confidence needs to be established and this has been gained by ensuring that the liaison officer has something of interest and value to offer to the manager. In the early days, this was not the case and visits were often unproductive as a result. These packages of interest have varied from joint membership schemes with British research associations to more recently what we call the sub-contracting service. This latter because it offers to the firm the possibility of new business and need to solve new problems has been particularly valuable in contacts with the engineering industry. Confidence in the service is developed further through its ability to deliver on the small enquiries placed. Continuing contact enables the officer to identify problem areas and assist the firm to define the problems. This provides direct feedback to the other divisions of IIRS. The service must concern itself as a priority in ensuring effective use by industry of the services of IIRS. The feedback identifies the real requirement of industry and assists the other divisions to define or redefine the services and technology which they are making available to industry. These can then be taken back to firms identified in the visit programme as having a need for the service or technology package. The communication links are active.

A typical case was that of a small firm the initial contacts with which established a good relationship. They became a member of a membership scheme and revealed their interest in introducing a new product line. A literature search was commissioned, then a quality control assessment was carried out and a scheme operated by an IIRS service until the firms own staff could be trained by IIRS. A consultancy project was commissioned from a British research association. Other inputs have followed, some from IIRS, others from elsewhere. Some have been initiated by the firm itself because the process has enabled it to develop direct links to sources identified.

The service was first organized on an industry sector basis with, for example, a food technologist visiting food processing firms, and was operated from headquarters. Awareness that the human characteristic of choosing a source close to hand was a factor in industry's demand on IIRS services led us to set up regional liaison offices in Cork and Limerick, the two largest cities outside Dublin. These have proved very effective linking in well as generalists with the specialist sector liaison officers. Local institutional involvement has been obtained by setting up committees representative of industry, regional development and higher education in these areas. These have assisted measurably in developing the communication links in both directions between the regional office and local industry and sources of information.

Some referral has been done to sources other than IIRS where appropriate, but generally there has not been any real development of links into universities or non-technical sources. This is a real weakness which is partly institutional, in the sense that the institution must remain within its scientific and technical remit. Experience has shown especially with the medium size and smaller firms that their need is for a communication link which would identify the sources for a much wider range of knowledge and information inputs.

The strength of the operation lies in the way in which we have brought other operations of the Technical Information Division to its support and reinforcement. The key to success in communication is personal contact maintained on a continuing level. The direct contact is not as frequent with all firms as it should be. Three bi-monthly publications containing short articles, abstracts, diary and other notes are designed very much not only as traditional-type current awareness services but also as media for maintaining the contact with firms and for bringing specific expertise to their attention. Courses are designed not merely to transfer defined packages of technology to identified groups from industry, but also to provide a forum for further personal contact between liaison staff and experts including from IIRS with the group who have an identified need. Behind these lie other communication activities. For example, the former bulletin of IIRS was converted into a national magazine, *Technology Ireland*, and as such is much more effective in creating an environment for the operation of the information service and IIRS.

Conclusion

There is no doubt that we still fall far short of the ideal. Feedback into sectors other than IIRS remains weak, but the creation of the NBST will I hope provide the opportunity to develop mechanisms both into the Board itself and into the whole knowledge/information system of the state. The links into industry are the first essential step in meeting the need for a national information service in the knowledge society as I have defined it.

This exposition is also relevant to the operation of information services in industrial and other organizations. The need for knowledge and communication resource management is as necessary at the micro-level as it is at the macro-level.

May I conclude with a quotation alleged to be two and a half millenia old, and indicating that there is little which is really novel. It is from Confucius: 'The essence of knowledge is, having it, to apply it.'

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The London classification of business studies: further progress towards a revised edition

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PREVIOUSLY IN *ASLIB PROCEEDINGS*,[1] there appeared a short report of the proceedings of the first seminar for users of the London Classification of Business Studies (LCBS) and the steps being taken to prepare a revised edition of the scheme.[2] Since then there has been a considerable amount of progress: the Working Party set up as a result of the first seminar has held several lively meetings; a questionnaire has been sent to users (and some non-users) of LCBS to obtain their views on its good and bad points and the direction which the proposed revision should take. There have been two further seminars for users, one at London in 1974[3] and the other at Oxford in 1976.[4] Most important, a grant of £6,000 has been awarded by the Social Science Research Council to Ken Bakewell, who will act as Executive Editor of the revised edition working in close collaboration with the original authors and helped by a Research Assistant, David Cotton, who will have the important task of testing the revised schedules and visiting major users so that their views and amendments can be taken into consideration in the revision.

The completed questionnaires received from thirty-five users indicated clearly that a revision was needed but that change should not be made simply for the sake of making change. Many users suggested areas where there should be changes and sometimes there was a conflict of views, indicating that the revision clearly cannot please everybody. One rather amusing comment from a non-user in answer to the question, 'Have you any other comments, criticisms or suggestions which might help the Working Party in its deliberations?' was 'Yes, what *is* the London Classification of Business Studies?' Clearly this respondent does not read his *Aslib Proceedings*, which has published an article by the original authors of the scheme[5] as well as the report mentioned above.

The future of LCBS

What future is there, in these days of centralization and standardization, for small specialized schemes like LCBS? The Polytechnic of Central London,

Aslib Proceedings, 29 (2), February 1977, p. 104–109. Printed in Great Britain

Management Studies Library, for example, has abandoned LCBS in favour of Dewey in order to make mor eeffective use of MARC services while, in the United States, the great Baker Library of the Harvard Business School is currently reclassifying from its own scheme to the Library of Congress.

But there is ample evidence of a continuing need for an up-to-date classification of business studies which can be used in numerous ways for ordering and retrieving information and that LCBS is needed no less in mechanized systems than in manual ones. Nearly 800 copies of the classification have been purchased and it is used for shelf arrangement and/or indexing in at least 57 libraries/information centres throughout the world (36 in Britain, 4 each in Australia and India, 2 each in Belgium and Indonesia and 1 each in Ethiopia, Germany, Israel, Italy, Kenya, Monaco, New Zealand, Swaziland and Trinidad).[5] Even before it was published, a modified version of it had been incorporated by Jean Aitchison and her associates into *Thesaurofacet*.[7] The Institute of Manpower Studies later developed certain parts of the classification and published it as *A classification of manpower studies*.[8] The recently published *Selective management bibliography* by Georges Sandeau,[9] an important guide to books and articles especially from Europe, is arranged in classified order using LCBS. A recent glossary of management terms by Derek French and Heather Saward[10] acknowledges LCBS as a source of terms in its introduction. An unpublished French translation of the scheme has been prepared for use in the Service Information et Documentation, in Paris. A whole stream of visitors—librarians, information officers and others—have come to the London Business School library during the past eight years for advice and discussion on the problem of classifying, arranging and retrieving business information in its various forms.

A policy statement prepared by the Working Party and accepted by the users of LCBS at the Oxford Seminar in June 1976 took into account the recommendations in the questionnaire survey of users that revision was needed but that change should not be made simply for the sake of making change.[4] The classification is a practical working tool for business libraries, so revisions should be kept to a minimum consistent with current developments and the schedules should not be tinkered with by classification theorists who might be somewhat removed from the realities of the business world. But we have to live with change and no classification can remain static. The revision must be able to cope with current literature and the changes which have developed during the past six years. It will make greater use of synthesis, but synthesis often means longer class marks so there will sometimes be enumerated subdivisions as alternatives. There will be more use of cross-references and scope notes. The index will be developed into an index-thesaurus, though the style of the thesaurus has yet to be determined. It could be an 'Aitchison-type' thesaurus, as used in *Thesaurofacet*, where the thesaurus complements the schedules and does not repeat any broader or narrower terms found there; or a 'Foskett type', as used in *London education classification*,[11] with the thesaurus repeating broader and narrower terms so that it can be used independently of the schedules; or a 'Soergel type',[12] where all the related terms are shown in the schedules and the index is simply a KWOC index of terms.

A problem arising from the revision of any classification scheme, as users of the Dewey Decimal Classification know only too well, is how to cope with the subsequent reclassification. Ideally what a classifier would like of a revised edition is new terms fitted into the existing schedules exactly where they are needed, with no other changes whatsoever. Nothing could be simpler: there would be no need for the classificationist to waste time rewriting and retyping whole schedules and producing new classes; no problem with changing class marks on catalogue cards . . . and labels . . . and spines of books, and then rearranging the shelves. Unfortunately for the classificationist and the user, however, revision cannot take place like this. As a new concept is inserted, so others need to be moved round either to make room for it or to give a better order somewhere else.

Our work so far has indicated that there are three main reasons for reclassification:

1. There may be a need for greater subdivision. For example, in the original edition AAC is used for 'Scientific theories of management' including participatory management, management styles, theory X and theory Y. In our draft revision this has been amended and expanded as follows:

AAC	Behavioural theories of management
AACB	Management styles
AACC	Participative management UF Employee participation in management, Theory X, Theory Y
AACD	The management grid UF Three-dimensional style, Tridimensional grid

2. There may be a need for improved collocation. For example, the management grid was originally classified under AB ('Management personnel') but seems more appropriately placed under 'Behavioural theories of management'.

3. It may be necessary to assimilate new topics. For example, in the original scheme there is no place for 'Junior boards of management' but in out draft revision they have been incorporated under 'Management personnel', thus:

	Draft revision	*Original*
AB	Management personnel UF Executives, Managers	AB
ABB	Directors UF Boards of directors	ABB
ABBB	Junior boards SN The participation of junior executives in decision making, normally in an advisory role	—
ABC	Top management UF Chairman, Chief executive, Managing director, President	ABBB
ABD	Middle and lower management	ABD
ABG	Consultants UF Management consultants	ABG
ABJ	Entrepreneurs	ABJ

The above examples show that revision can sometimes be relatively painless, with many subjects retaining their original notation.

One class which needs more drastic revision is F (Personnel Management). Apart from the need to delete unnecessary detail and make certain expansions, there will have to be a complete rewriting and repositioning of some sections. The original edition had a major split between industrial relations at the plant level (in Class F, Personnel Management) and industrial relations at the national or international level (in Class J, Economics). While there are logical reasons for this separation, it does not produce a very practical arrangement for a business library and in the revised edition the two aspects will be collocated. To allow for this, Class G will probably be used for Industrial Relations, meaning that Office Services (originally at G) will have to be moved. Two members of the Working Party, Marilyn Arnott and Deirdre Gill of the Institute of Personnel Management, have been largely responsible for the revision of this subject area.

Another class which will show a fair number of changes is the fringe class N (Education). Apart from a general need for 'tidying up' and for the removal of some duplication, it was felt desirable to take account of the second edition of *London education classification*, which it is suggested should be used when greater detail is required. The following outline shows the changes which are likely to be made:

	Proposed	*Original*
NA	Education	NA
NB	Educational assessment	NK
NC	Study methods	NH
NE	Teaching methods	NE
NF	Group teaching methods	NEF
NG	Teaching equipment	NF
NH	Educational technology	NF
NJ	Courses	NC
NK	Curriculum	ND
NN	Educational institutions	NC+NN
NR	Careers	NR

The new Class Y (Library and Information Science) is another broad class which takes account of developments elsewhere, this time the Classification Research Group's *Classification of library and information science,*[13] to which users are referred if they need more detail than is provided in LCBS.

The problem which the revised edition will present to users has already been mentioned, but it is not a problem unique to LCBS. How many users of the Dewey Decimal Classification are able to reclassify their libraries as new editions appear? The revised edition should still help users unable to undertake reclassification by acting as a source of new terms. Such users will be able to look up the term they want, see what groups of terms it relates to in the revised edition, and fit it into the nearest similar place in their existing schedules. For example, a library might want a place for 'work to rule', which is in the new schedules but not the old. In the draft revision it is at GHD, under GH, Labour disputes. Looking up 'Labour disputes' in the first edition, the user would find it as JWS, so that 'work to rule' could easily be fitted in at, say, JWSM. Similarly it would be simple enough to expand JWQ (Trade unions) in the first edition schedules with the detail given under GC in the draft revision as follows:

	Draft revision	*Expansion using original notation*
GC	Trade unions Indicate Blue collar unions, White collar unions, Supervisor's unions, Management unions by synthesis with Auxiliary Schedule 1, International unions by adding 50 from Auxiliary Schedule 5	JWQ
GCA	Trade union organization UF Trade union management	JWQA
GCB	Elections	JWQB
GCBC	Voting UF Ballots, Ballot rigging	JWQBC
GCC	Trade union rules	JWQC
GCD	Closed shop SN Includes both pre-entry and post-entry closed shop; union membership agreements	JWQD
GCE	Union finances	JWQE
GCEB	Union dues UF Check off	JWQEB
GCF	Discipline of members	JWQF

When making this kind of adjustment, however, it is important to avoid doing what a Dewey user did when amending his 16th edition with terms from the 18th. He forgot to link changes in the notation with the hierarchy of the scheme, resulting in 'capital punishment' being subsumed under 'reformative treatments'. He also placed 'middle age' under 'imagination', but that may have been a comment on life.

Some libraries may feel able to classify part of their library—core subjects, for example—by the revised edition, leaving the first edition to cope with fringe subjects. Still others may have the time, inclination, energy, staff and money to reclassify the whole of their stock by the revised schedules. Then, of course, there is the ever-growing body of new users, who will welcome up-to-date schedules and an index to match.

With luck, the grant from the Social Science Research Council will enable us to complete the revision during the coming year so that we shall be ready to go to press at the end of 1977 or the beginning of 1978, though we still have to find a publisher and we are also committed to presenting the draft revision to a fourth seminar for users during the summer of 1977. Last but by no means least we must, as pointed out by one of the users at the Oxford seminar, look to the future and think in terms of the third edition. Hopefully the royalties on sales of the second edition will allow us to keep the Working Party in being and ensure the future maintenance of the scheme in much the same way as

Jack Mills has suggested that the *Bibliographic Classification* will be maintained.[14] Indeed the revision of LCBS has something in common with the revision of the *Bibliographic Classification*, and we shall do our best to keep in touch with Jack Mills and his colleagues as well as with other classificationists.

Summary

Work on preparing the LCBS started in 1967. There has been much progress since then in the development of business libraries, in the control and documentation of the literature of management and business, and in the understanding of how the literature is used. LCBS has contributed in some measure to the progress made in the last ten years, but its future depends on the need to keep it under review so that it can cope with needs of developing thought and practice in this important subject area with so many interdisciplinary and diverse aspects. The revised edition, therefore, is building on experience gained and aims to provide a structure within which further developments can take place in the ordering and control of the literature in mechanical and manual systems.

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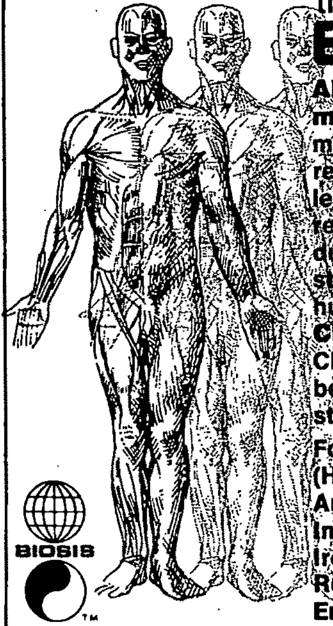

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Experiences in the use of keyword indexing and microfilm in the technical information service of the OVAKO Group

Pekka Pohjola

Head of the Technical Information Service, OVAKO
Research Centre, Imatra, Finland

Introduction

THE OVAKO GROUP is a Finnish steel concern of 3,500 employees. More than half of its production, mainly for finished special steels made from 700,000 tons of crude steel a year, is exported to Europe and the USA among others, to the automotive industry. The Group's ability to compete is based on high quality which is continually maintained and developed by the Research and Development Organization. The Library and its technical information service have an important function in supplying new and relevant information to the Research and Development team and others in the Group.

Difficulties in obtaining relevant information

The Technical Information Service was established in 1970 when it was realized that the existing and commercially available systems were not able to answer many of the important questions relevant to our research and development work.

Information searches, using commercial systems, frequently resulted in irrelevant references or none at all, for reasons apparently of a very broad coding level, shallow indexing and gaps in coverage.

Although mass storage units and time sharing on worldwide information networks developed during the last few years have made it possible to carry out literature searches quickly and easily, the value of our own system has not been lessened by these new developments. To quote an example of a search using external resources, we recently tried to find information on some specific properties of certain types of steel. One file (CHEMABS) containing over two million references, going back seven years and covering metallurgy as well, was used on-line by our terminal. The result was unsatisfactory. We found 600 references relating to these steels five of which related to properties in which we were not interested, but not a single reference was directly relevant.

Information retrieval system

Our own system is based on the use of keyword indexing, combined with microfilm. It does not attempt to compete with existing sources of information, but complements them. This policy is in line with that of the OVAKO Group which, because of its small capacity, does not attempt to compete with the large steel-making concerns, though it is competitive in product quality. Similarly,

Aslib Proceedings, 29 (3), March 1977, p. 112–117. Printed in Great Britain

our system of information retrieval concentrates on the quality of the references, not on the quantity, whereas the big information centres collect large data files. In our field we store only the most relevant items from the literature and allocate keywords as pertinently as possible.

Our own system is characterized by the following features:

1. *Coverage*: Internal and selected external reports which are not included in outside retrieval systems
2. *Depth of indexing*: Index terms are determined as pertinent as possible; 30 per cent of our index terms belong neither to the Thesauras of Metallurgical Terms of The American Society of Metals nor to the Thesaurus of Engineering and Scientific Terms of the Engineers Joint Council
3. *Minimum time delay*: New material incorporated into the system as quickly as possible
4. *Improving relevancy*: Only information from periodicals and other sources considered directly significant to our own particular activities is accepted as input material
5. *User participation*: Users are encouraged to determine the indexing language as this makes subsequent usage easier for them. The indexing language is therefore understood by both users and staff of the information department. English is used because there is no suitable Finnish thesaurus
6. *Efficiency and economy*: Search times are short; recall is relevant and the costs of running the system are minimal.

Users of the system are encouraged, indeed it is considered part of their responsibility, to allocate concept terms to input material. Being specialists in their subject fields, they are best qualified to do this. This responsibility does not measurably increase their work load as it takes little of their time to write down keywords appropriate to the articles they read in journals which are circulated to them. Keywords allocated in this way are checked by the staff of the information department before input into the system .

Input of the information

The indexing terms with bibliographic descriptors are typed and entered into the reference catalogue of the indexed documents. A consecutive number is allocated to every indexed document. There is one peek-a-boo card for each keyword and cards corresponding to every keyword of the document are punched at the appropriate number. (See Figure 1.)

Microfilming

Microfilm is used for two reasons:

1. Safety of the stored information
2. Savings in storage space and cost of storage equipment. The indexed documents are filmed onto 16 mm microfilm, and then jacketed. Microcards are produced by Diazo duplication from the jacketed film. (See Figure 2, p. 116.)

Information recall

The search question is expressed in keywords. Logic operations *and*, *or not* are

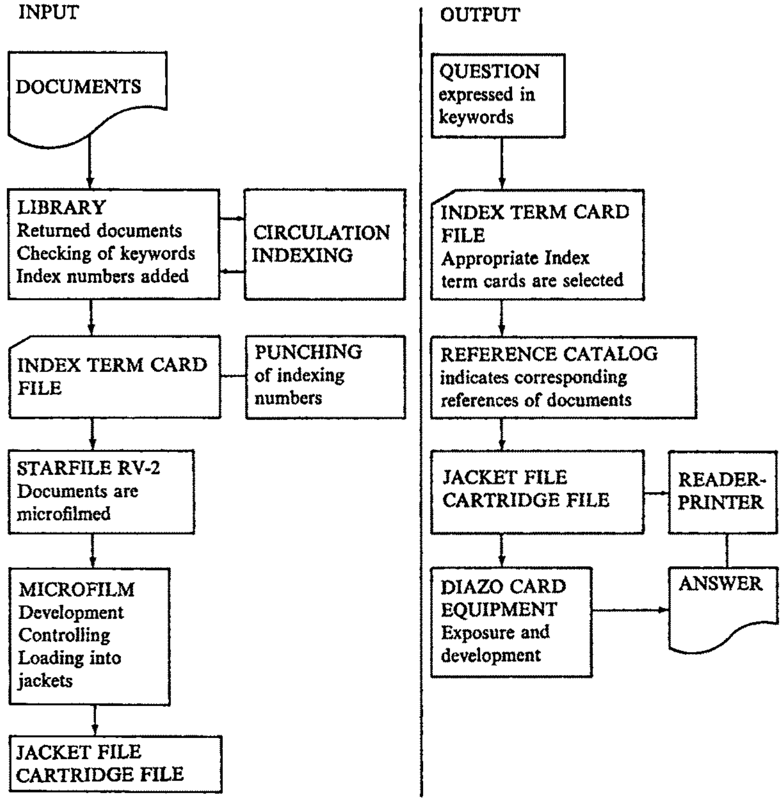

FIGURE 1: *Principle of the function of the system*

possible either by placing the cards, corresponding to different index terms on each other or by selecting the references from each individual card. Providing the index term file gives some index numbers, the reference catalogue of the indexed documents is consulted to identify the document in question. If the reference appears relevant, then the corresponding documents (microfilm or microcard) can be read on a reader, or a paper copy made from a reader printer.

Equipment and equipment costs

	Price £
Peek-a-boo cards (3,000)	95
Card file revolver	606
Drilling machine for cards	303
Microfilm camera	1,520
Reader–Printer	1,500
Microcard reader	227
Jacket loader	1,000

Diazo card equipment	952
TOTAL:	£6,203

Running costs

Increase 500 documents/year	*£/year*
Indexing (3 min/doc) £5.23/h	131
Checking of indexing (3 min/doc) £4.76/h	119
Typing of references (5 min/doc) £2.06/h	85
Punching cards (5 min/doc) £2.06/h	85
Microfilming (20 pp/doc, 400 pp/h) £2.06/h	52
Microfilms (4 reels of 2,500 pp)	25
Jacket loading (5 doc/3 min) £2.06/h	10
Maintenance of controlled term list	212
TOTAL:	£719

$$\text{Running costs/document} = \frac{£719}{500} = £1.44.$$

Efficiency of the system

Our system has not grown into a large one during some years of active use because our policy is for severe selection of the indexed documents. At present the file includes 2,500 items and the controlled term list contains 1,500 index terms.

As an example of the efficiency of the system, let me recall one information search which was carried out when the file contained only 500 items. A comparative search was carried out with a commercial system (*Metals Abstracts*). The question concerned the making and properties of certain types of steel. The numbers characterizing the searches are given in Table 1. (See p. 116.)

$$\text{Precision} = \frac{\text{Number of relevant items found in search}}{\text{Number of items found in search}}$$

On the basis of this precision formula, our system in this search was nearly twice as effective although it contained only a small fraction of the items included in the outside system. Actually, the precision was higher, because the 500 items included also our own and external reports which were not within the scope of the commercial system. Search time for system was considerably faster. Note should be taken of the modest capacity of our system. At the time when this comparative search was made, the indexing of documents from *Metals Abstracts* was small compared with the number now being indexed. At present our system contains at least 1,000 items which are also included in *Metals Abstracts*. Differences exist mainly in the depth of indexing and in time delay.

The Future

According to my understanding, our own system, although simple, has con-

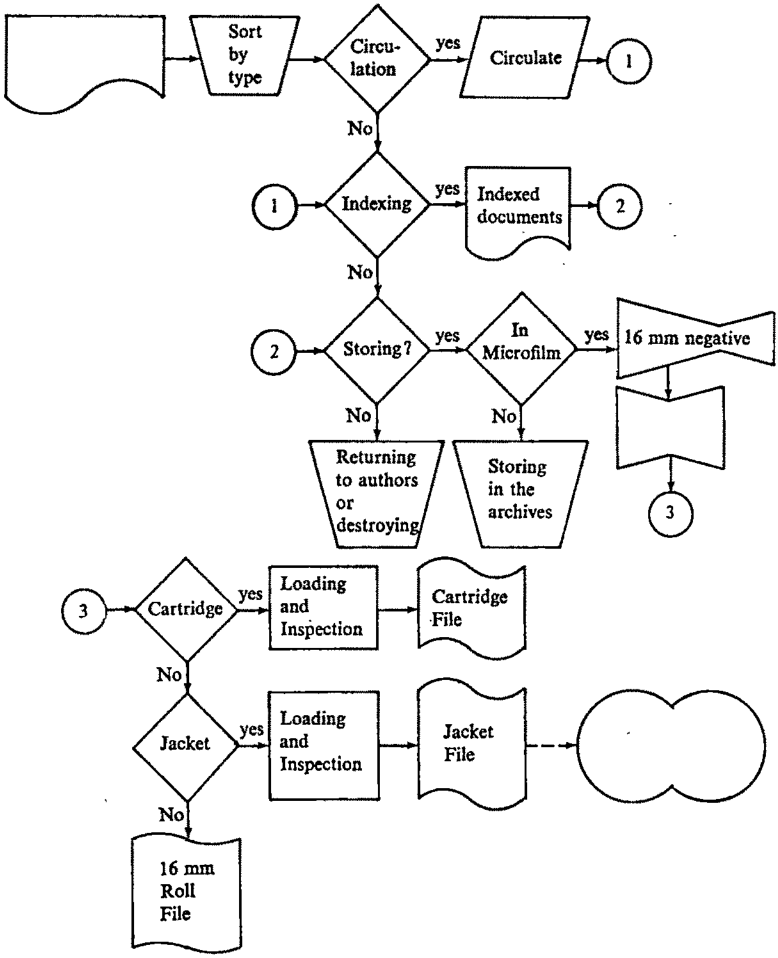

FIGURE 2: *Treatment of the documents*

	Own system	*Outside system*
Total number of items	500	100,000
Retrospective to year	1971	1970
Number of items found in search	23	102
Number of relevant items	2	5
Precision (accuracy), per cent	8.7	4.9
Coverage, years	2.5	4
Search time, minutes	10	750

TABLE 1: *Comparison of two searches*

siderable possibilities for expansion and development and it is difficult to imagine that a computer-based commercial on-line system could at present meet all the important criteria mentioned earlier. However, an in-house computer-based on-line system will be installed in the information department in the future. It will then be possible to conduct comparisons between the computer and our present system which uses peek-a-boo cards and a reference catalogue of indexed documents.

Summary

The information storage and retrieval system of the Technical Information Service of the Finnish OVAKO Group operating in the field of steelmaking is reported in this presentation. The system is based on the use of keyword indexing and microfilm. Published information relevant to our activities, and company reports are included in the system. The documents are microfilmed and converted to jackets from which microcards are made. The associated advantages of our system are improvements in depth of indexing, better coverage, relevancy and effectiveness. Capital investment for the necessary equipment and running costs is relatively small.

A comparison of issues and in-library use of books

*C. Harris**

Newcastle upon Tyne Polytechnic

FOR A VARIETY of reasons, librarians are continually obliged to examine the extent to which their bookstocks are used. This obligation may arise out of simple curiosity, to provide comparisons with other time periods or other institutions, or to measure the extent to which prescribed objectives are being reached. Increasingly, because space is limited and some means must be devised of selecting material for relegation to a less expensive form of storage or for withdrawal completely, the criterion set for relegation is usually one of use.

Measuring the total use of a collection

Most circulation systems provide a means, usually a date label, for identifying the number of times a book has been issued, the only major shortcomings of the date label being that, in academic libraries particularly, renewals of loans may be made without the new due date being added and, among undergraduates especially, a book may be used by several users with only one issue being recorded. Otherwise, issues are usually easy to identify and count.

A more serious problem in measuring the total use of a collection is that of identifying and counting uses of books within the library.

At Newcastle upon Tyne Polytechnic it has been the practice for several years to stamp the date label of books reshelved by the library staff after use within the library. A red stamp is used for this purpose; a black stamp is used for issues.

As part of a more comprehensive study of stock use at Newcastle Polytechnic, a survey was undertaken to compare rates of issue and of in-library use, as indicated by black and red date stamps. A 10 per cent sample of the general open-access bookstock (excluding reference material, periodicals, official publications and certain material held in closed access stacks) was examined, towards the end of July 1974 and all issues and in-library uses since 1st January 1973, as represented by black and red date stamps, were counted. The library's total monograph stock at the time of the survey was 100,437 of which 84,830 were in the open access, borrowable collection, and not actually on issue. The sample therefore included 8,483 volumes.

Table 1 shows the combined issues and in-library uses of these 8,483 items.

It must be borne in mind that these numbers of uses are underestimates, for two reasons. First, the in-library uses indicated are the most 'serious' in-library

---

* This paper was undertaken as part of a project supported by OSTI (now BLRDD) at Newcastle upon Tyne Polytechnic. The author was Research Associate on the project and is now Subject Specialist in Social Welfare with the Travelling Workshops Experiment at Newcastle upon Tyne Polytechnic.

Aslib Proceedings, 29 (3), March 1977, p 118–126. Printed in Great Britain

		Number of in-library uses						
		0	*1*	*2*	*3–5*	*6–10*	*11+*	*Total*
Number of issues	*0*	4177 49.2%	338 4.0%	60 0.7%	22 0.3%	0	0	4597 54.2%
	1	1344 15.8%	230 2.7%	55 0.7%	23 0.3%	1 0.01%	1 0.01%	1654 19.5%
	2	579 6.8%	167 2.0%	48 0.6%	26 0.3%	3 0.04%	0	823 9.7%
	3–5	639 7.5%	244 2.9%	94 1.1%	59 0.7%	3 0.04%	1 0.01%	1040 12.3%
	6–10	179 2.1%	84 1.0%	35 0.4%	38 0.5%	2 0.02%	0	338 4.0%
	11+	16 0.2%	8 0.1%	4 0.05%	3 0.04%	0	0	31 0.4%
Total		6934 81.7%	1071 12.6%	296 3.5%	171 2.0%	9 0.1%	2 0.02%	8483 100%

TABLE 1: *Combined issues and in-library uses*

uses, i.e. those that are taken from shelves to tables (and left there) and as will be seen later, are a severe underestimate of all in-library uses. Second, although the issue figures are quite accurate, subject to the limitations mentioned earlier, the real use *rate* is higher than the figures suggest. The number of books available for use at the end of the nineteen-month period for which uses were counted, 84,830, includes all of those added *during* that period, approximately 26,700, each of which did not have the same chance of being used as those volumes that were already in stock at the beginning of the period. This does not mean that the actual number of uses counted is inaccurate but had all books been available for the entire period, more uses of recently acquired books would have occurred and the frequencies of use shown in Table 1 would have been higher.

It will be seen from Table 1 that books with no issues or recorded in-library uses for the nineteen-month period, comprise under half (49.2 per cent) of the bookstock; under 55 per cent had no recorded issues and just over 80 per cent had no recorded in-library uses.

If Table 1 is subjected to a chi-squared test of association, a statistically significant connection is found* between the number of issues and the number of in-library uses a book is likely to get.

The consequence of this association is illustrated graphically in Figure 1. The three curves show the cumulated percentages of volumes of stock that account for the cumulated percentages of uses. Curve A shows in-library uses, Curve B shows issues, and Curve C shows in-library uses and issues combined. It can be seen that all in-library uses are accounted for by just over 18 per cent of stock,

---

* $\chi^2 = 959$, d.f. $= 15$, $p < 0.001$. In-library use frequencies 6–10 and 11+ have been combined with frequency 3–5 (thus giving a frequency 3+) to remove empty cells.

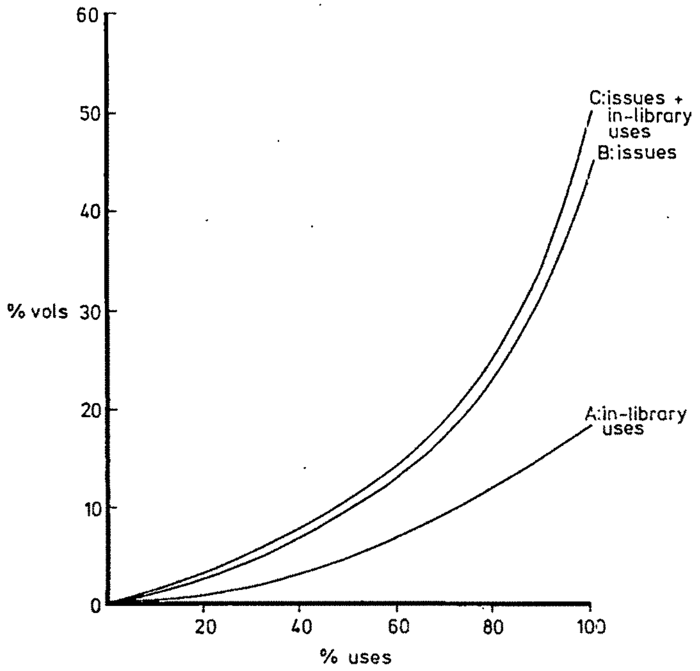

FIGURE 1: *Cumulated issues and in-library uses*

and all issues are accounted for by just over 45 per cent of stock, but all uses of both types are accounted for by under 51 per cent of stock. Only 5 per cent of stock receives recorded in-library use but does not issue. The difference between Curves B and C is the proportion of stock necessary, in addition to B, to accommodate in-library uses as shown by Curve A. The closer one gets to the origin, the more intensively is the stock used, and the narrower the gap between Curves B and C becomes.

No. issues	*Date of addition to stock*			
	pre 1972 *% stock used IL*	*1972* *% stock used IL*	*post 1972* *% stock used IL*	*Total* *% stock used IL*
0	9.8	11.7	7.4	9.1
1	29.9	21.8	13.7	18.7
2	31.7	31.4	24.8	29.7
3–5	41.3	39.1	31.0	38.6
6+	46.6	49.4	46.5	47.1
Overall Stock	20.0	22.8	13.3	18.3

TABLE 2: *Proportion of books used in the library according to the number of times the books have been issued*

No. IL uses	Date of addition to stock			Total
	Pre 1972 % stock issued	1972 % stock issued	post 1972 % stock issued	
0	40.6	46.8	35.8	39.8
1	69.9	70.7	63.5	68.4
2	79.9	83.9	75.4	79.7
3–5	88.0	95.8	76.7	87.1
6+	100.0	100.0	100.0	100.0
Overall stock	47.4	53.5	39.9	45.8

TABLE 3: *The proportion of books issued according to the number recorded of in-library uses*

There are other ways of looking at this connection. Table 2 shows the proportions of books used in the library according to the number of times the books have been issued: Table 3 shows the reverse—the proportions of books issued according to the number of recorded in-library uses they have received. Both tables have been divided according to the dates of addition of books to stock, and in both tables the frequencies 6–10 and 11+ have been combined to give a frequency of 6+.

One encouraging feature of these tables is that use rates seem to progress comparably for books of all ages (*i.e.* acquired at different times), suggesting that, whatever the disadvantages of using the red date-stamp method to count in-library uses, it does seem to be consistent. Of course, a greater proportion of material acquired in 1972 was used than of that acquired prior to 1972. As pointed out earlier, the material acquired after 1972 was not available for use for the duration of the survey period; in fact, if the stock growth rate after 1972 was constant (which it was, approximately) then the *rate* of use of stock is probably twice as high as that suggested by these figures, which indicates that material acquired after 1972 is more heavily used than material acquired during 1972, reflecting a general preference for novelty of stock.

If, in fact, these estimates of in-library use are consistent (i.e. although they are underestimates, they are not biased in favour of any section of the bookstock), then there appears to be some difference among subject classes in the extent to which the probability of in-library use is related to issues, and vice versa. This can be seen in Tables 4 and 5. The percentages expressed in the cells of Table 4 indicate the percentage of books in each class that have been issued the number of times shown in the left hand column that have also been used in the library and vice versa in Table 5. The row totals (*i.e.* in the right hand columns) in Tables 4 and 5 show the overall percentages of stock with different frequencies of issues and in-library uses respectively. The totals in each column in Tables 4 and 5 indicate the percentages of books in the ten major Dewey classes that have received *any* recorded in-library uses and issues respectively.

No. issues	*% stock in each class used in library*										*Total*
	000	100	200	300	400	500	600	700	800	900	
0	9.0	9.8	8.0	12.9	11.3	4.2	8.5	11.8	6.0	14.4	9.1
1	20.7	17.1	29.4	27.2	20.0	10.2	15.3	14.1	20.4	22.9	18.7
2	29.0	36.4	0.0	37.1	11.1	13.9	21.7	36.0	24.1	54.4	29.7
3–5	56.3	32.1	33.3	50.9	25.0	24.0	30.6	41.2	35.9	47.5	38.6
6+	41.7	40.0	—	59.4	0.0	28.8	34.8	51.9	76.9	90.0	47.2
Overall stock	22.8	18.0	12.2	26.7	13.0	8.9	16.5	19.4	13.6	24.5	18.3
No. books in sample	316	384	98	2036	100	1590	1691	831	854	583	8483

TABLE 4: *Percentage of books in each class that have been issued and that have also been used in the library*

No. IL uses	*% stock in each class issued*										*Total*
	000	100	200	300	400	500	600	700	800	900	
0	42.2	41.6	19.8	42.9	27.6	36.0	49.8	37.3	30.5	32.3	39.8
1	76.5	60.2	45.5	72.7	33.3	66.7	71.8	62.4	68.2	59.6	68.4
2	93.3	93.3	—	78.4	100.0	87.5	87.5	61.3	77.3	72.4	79.7
3–5	83.3	100.0	100.0	92.2	33.3	83.3	91.7	84.2	88.9	70.0	87.1
6+	—	—	—	100.0	—	—	100.0	100.0	—	100.0	100.0
Overall stock	51.0	46.9	23.5	51.9	29.0	39.1	54.2	42.7	36.1	40.3	45.8
No books in sample	316	384	98	2036	100	1590	1691	831	854	583	8483

TABLE 5: *Percentage of books in each class used in the library and that have also been issued*

The sizes of the sample of bookstock in each class (10 per cent in all cases) are shown in the bottom row.

It will be seen from these tables that the classes that follow the general pattern least closely—200 and 400—are also those with the smallest stocks and, except for in-library use of 500, with the smallest proportions used, giving a patchy use pattern. Otherwise all classes, with few minor exceptions, follow the general pattern of having higher probabilities of use of one kind associated with higher frequencies of use of the other kind, although the strength of this association does vary among different classes.

The estimation of in-library uses

It has been apparent, so far, that the proportion of books being borrowed is far greater than that being used in the library. Intuitively, it seems that more books will have been consulted in the library than the figures reported here suggest. The accuracy of these figures is determined, of course, by the definitions of issues and in-library uses used as a basis for data collection.

Issues, as has already been suggested, are reasonably well represented by black date stamps. In-library uses are a rather different matter. Much effort and attention is devoted by librarians to the problems of defining in-library use, rather inconclusively. An issue is an issue and is identifiable as such, regardless of the use to which the book is put following the issue but no such convenient notion of in-library *use* exists. The in-library uses discussed earlier are those that are represented by red date stamps. To acquire such a stamp, a book must be removed from a shelf and not returned to the shelf by the user (but not issued). Clearly, there are several problems with this method:

1. Books may be consulted at the shelf either as browsing or as part of a search for a specific piece of information, and returned immediately to their proper places (or to other places).
2. Books may be taken from the shelf, used away from the shelf, and returned to the shelf by the user.
3. A book may be used more or less simultaneously by more than one user, or it may be left on a table by one user and found and used later by another user.
4. The red stamping used to gather this data was not done specifically for the research project, but as a routine library operation. It is quite possible, at certain times during the nineteen-month period, that some, though not many, books that were entitled to red stamps did not, in fact, receive them, due to shortage of staff time, etc.
5. It is possible that users will take books to tables and leave them there, without actually having used them. (Of course, the same applies to issues, books may have received black date stamps without being used.)

The first four possibilities would result in total in-library use being underestimated by the red stamps, and only the fifth—the least probable— resulting in the opposite. Clearly, then, total in-library use has been underestimated.

In another study of this sort, however, these problems were deliberately ignored:

> 'Books a user reshelved were not counted. We assumed that if he reshelved a book immediately after a moment's examination, then he demonstrated neither interest nor use and that no count need or could be taken We also assumed that if he took a book out of the library or took it to a table until he had gleaned what he needed, then he had demonstrated measurable interest and the book should be counted '[1]

The assumption here, that uses that are followed by reshelving are not important uses, is one that most librarians would probably not accept. Obviously some more meaningful conceptions are needed, both of use (*i.e.* types and extents of use) and usefulness (since 'useless uses' could not constitute a case for retaining a book). Some researchers have attempted this; Fussler and Simon used the notions of 'loose core' browsing and 'tight core' browsing;[2] the Newcastle University MASCAL[3] project attempted to measure useful and not useful browsing.

These approaches involve collecting additional information from the users themselves, which is both time consuming and introduces the problems of response rates and errors of various kinds and we wished to avoid this, so we attempted simply to estimate the difference between recorded in-library uses and consultations of any kind.

In-library consultation survey

A short survey was undertaken of samples of books (excluding reference books) in four subject areas, to count the number of books that had received any in-library use, of any kind. This was done using a modification of a method first observed in use in the library of the University of Newcastle. A slip is placed in the selected book in such a way that it cannot be seen unless the book is removed from the shelf and consulted, in which case it cannot fail to be seen. The user is asked, on the slip, to throw the slip away. The book cannot be used without the slip being obviously disturbed, so even if the user does not do as he is asked, the use of the book is detectable. Sampled books are marked so that they can later be identified and checked for the presence or otherwise of the slip. 2,400 slips were placed in a 20 per cent sample of books in four different subject areas on October 31/November 1. The books were checked again at the end of term on December 18/19. There was no reason to assume that this period was in any way atypical in patterns of library use, but there was, equally, no reason to assume that the selected subject areas were in any way typical—possibly the reverse, since we included Art books simply because it was believed that a great deal of browsing takes place in this area.

In Table 6, the number of slips placed in books in each subject area is shown in column *a*. The number of books found to contain slips at the end of the survey period is shown in column *b* and is expressed as a percentage of the total number of slips placed in column *c*. The number of books that had been slipped but from which slips were missing or had been disturbed by the end of the survey period is shown in column *d*, expressed as a percentage of the total number of books slipped in column *e*. Column *f* shows the number of books that had been red-stamped during the survey period, and column *g* shows these as a percentage of the number of books with missing or disturbed slips. Column *h* shows the numbers of books that had been slipped but were not found at the end of the survey period and were assumed to be on issue (although they may have been in use within the library, but this is unlikely as it was the end of term and a particularly slack time) and column *i* shows these as a percentage of the number of books slipped. Columns *b*, *d*, and *h*, of course, add up to the total number of slips placed in books—column *a*.

The overall result was that, of the 2,400 books that had slips placed in them, 252 (10.5 per cent) could not be found at the end of the survey period and were assumed to be on issue, 964 (40.2 per cent) were found with slips undisturbed and were assumed not to have been consulted during the survey period and 1,184 (49.3 per cent) were found with slips missing or disturbed. These books were assumed to have been consulted in the library (apart, of course, from a very small number that may have been issued and returned within the survey period, but these are only estimated at around 5 per cent of all those books that had slips missing). Of these 1,184 only 62 (5.2 per cent) had been red-stamped. Thus for every book that had a recorded in-library use, there were approximately nineteen others that had received sufficient use to disturb the slip, but for which no use had been recorded.

This, then, is the connection between these two extreme definitions of in-library use, the number of books receiving any consultation at all is 20 times as high as the number being used at desks and not being re-shelved. This relationship differs markedly by subject, as one might expect, with a 45 to 1 ratio of consultation to recorded in-library use ratio in 610 (a nursing collection rather than a general medical collection) and a 9.5 to 1 ratio in 700–709 (with some classes having an infinite ratio). Of course, only a very narrow range of subjects was included in this survey, with a deliberate concentration on 700, since this was the area in which a high rate of browsing was thought to occur.

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*
Class	*No of slips placed*	*Slips in*		*Slips out*		*No. books with red stamps*	*f as % of d*	*Books not found*	
		n	%	*n*	%			*n*	%
700–709	421	157	37.3	195	46.3	21	10.8	69	16.4
710–729	232	107	46.1	106	45.7	10	9.4	19	8.2
730–769	745	271	36.4	413	55.4	19	4.6	61	8.2
770–779	62	27	43.6	35	56.5	0	0	0	0
780–789	27	7	25.9	16	59.3	0	0	4	14.8
790–799 EX.	42	18	42.9	21	50.0	0	0	3	7.1
791.43	67	6	9.0	38	56.7	3	7.9	23	34.3
700T	1596	593	37.2	824	51.6	53	6.4	179	11.2
610T	495	213	43.0	229	46.3	5	2.2	53	10.7
540*	na†	82		42		0	0	na	
620*	na†	76		89		4	4.5	na	
540/620T	309	158	51.1	131	42.4	4	3.1	20	6.5
Total	2400	964	40.2	1184	49.3	62	5.2	252	10.5

* These samples were not of the entire 540 and 620 stocks but of sample bays.
† Not available, i.e. not counted separately at time slips were placed.

TABLE 6: *Results of in-library consultation survey*

Conclusion

This paper had two aims; one was to compare issues and recorded in-library uses of specific books, the other was to assess the accuracy of a method of recording in-library use.

In the comparison of issues and in-library uses, the evidence seems to suggest that, even if complete data on in-library use are not available, at least the numbers of in-library uses that are recorded seem to be very closely associated with numbers of issues, which can be fairly reliably counted, suggesting that issues can be used as an indicator of total use.

It became clear, however, that the method of counting in-library uses greatly underestimated the total amount of in-library use, although the extent of the underestimate varied by subject. Although the actual numbers of uses were not counted, it is clear that the number of books being consulted is approximately twenty times as high as those receiving recorded in-library use. Clearly, then, any relegation or withdrawal on the basis of recorded in-library uses (combined with issues) would result in many books being removed that would otherwise have been consulted (since 60 per cent of selected areas of stock is consulted in six weeks!) This does not take account of the nature or seriousness of the consultations, however, and clearly, further elucidation is necessary to discover, in particular, whether the high level of consultation represented use of interesting and relevant stock, or a search for interesting and relevant stock.

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Scientific journal budgeting: where does the money go?

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THE CONTINUING DEBATE on scientific journal price increases, photocopying and networking, if nothing else, at least serves to focus our attention on one thing: the paucity of collected and detailed financial information on UK libraries. Only in the academic sphere can we find anything other than fragmented and non-comparable statistics and even there the information goes little further than overall expenditures on books, journals, binding and salaries. In the USA, the recent Fry study[1] goes some way to filling a similar gap by collecting a large amount of data for a several year period and similar studies here would be useful.

One aspect not considered in the Fry study or elsewhere, is where the money for journals actually goes. For example, how much goes to commercial compared to learned society publishers, which countries get what proportion of the budget, how much would be saved by cutting out multiple copies? Such studies on cash flows can help inform the debate on several of the issues just mentioned. Ideally, one would also like to have data on where the money comes from and follow the various cash flows (including those for primary research) through the system. This article therefore represents another fragment of the picture. The 1975 journal holdings of three UK physics-related libraries from different sectors have been taken to see which type of publishers receive the largest portions of the budget. It might be of interest to librarians in similar, or even totally different, subject fields to see how their budget breakdown compares to these.

Figure 1 (p. 129) gives the overall picture for the three main publishing nations, at least as far as the above UK journal budgets are concerned. Although the Harwell library is very much larger than the others, they all have some features in common:

1. The UK share of the budget varies from 26 to 37 per cent, *i.e.* ⅔–¾ of the total budget goes abroad
2. In each case 18–20 per cent of the budget goes to Dutch publishers
3. 80–90 per cent of the budget goes to the USA, UK, Netherlands, publishing predominantly in English.

Data for Mullards Research Laboratory Library are shown in Table 1. Tables 2 and 3 show the broad commercial/learned society breakdowns for Maria Mercer Library, Bristol University and Harwell.

Before we can draw any conclusions from these figures we need some idea of what sort of journals we are considering. Grenfell[2] devotes a six-page appendix

Aslib Proceedings, 29 (3), March 1977, p. 127–132. Printed in Great Britain

Publisher type	*Country*	*No. of titles*	*% sector*	*% total*	*Multiples*	*Cost of multiples* £	*Mean cost/title* £	*Mean cost/copy* £	*Total cost* £	*% of sector*	*% total*
Commercial	UK	69	45		18	381	24.3	18.8	1,677	31	
	USA	50	33		26	206	24.4	20.2	1,218	23	
	Netherlands	19	13		1	166	104.8	96.1	1,992	37	
TOTAL *Commercial*	(All countries)	151		46	45	771	35.3	30.2	5,330		47
Learned society	UK	51	31		23	774	38.6	23.5	1,970.53‡	36	
	USA	98*†	60		64	1,179.8	32.2	20.2	3,161.8	57	
TOTAL *Learned society*	(All countries)	163*		49	89	1,953	34.1	22.1	5,560		49
TOTAL *(including all types of publisher)*		332				2,734		26.0	11,350		

* IEEE transactions treated as 32 titles.
† 10 USSR translation journals.
‡ £1,265.5 of this is accounted for by Chemical Society and IoP publications.

TABLE 1: *Data for Mullards Research Laboratory Library*

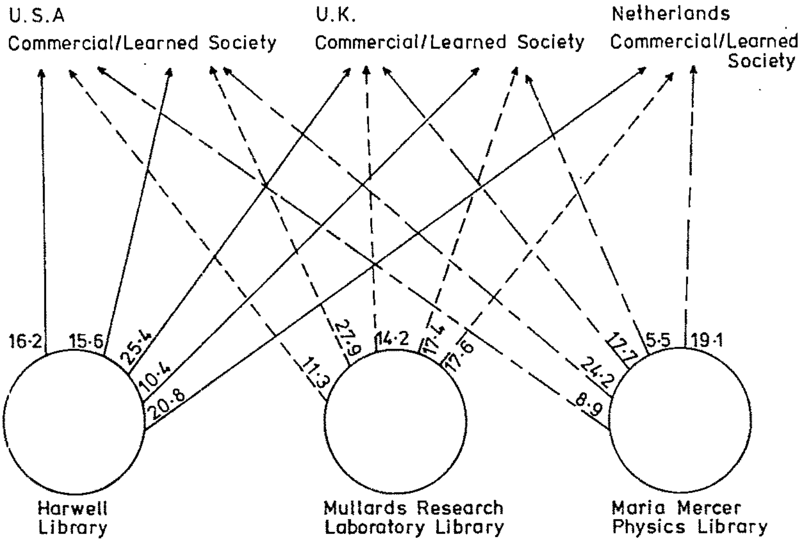
U.S.A
Commercial/Learned Society
U.K.
Commercial/Learned Society
Netherlands
Commercial/Learned Society
16·2
15·6
25·4
10·4
20·8
11·3
27·9
14·2
17·4
17·6
12·7
24·2
8·9
5·5
19·1
Harwell Library
Mullards Research Laboratory Library
Maria Mercer Physics Library

FIG 1: *Percentage of three U.K. library journal budgets going to major publishing countries.*

Publisher	*No.*	%	*Cost* £	%	*Cost/title* £
Commercial	84	48.8	4,580	56.9	54.5
Learned society	77	44.8	3,218	40.0	42.9
TOTAL (*All publishers including government agencies etc*).	172		8,050		46.8

TABLE 2: *Maria Mercer Library holdings by type of publisher*

Publisher	*No. of titles*	%	*No. of multiples*	*Cost of multiples* £	*Total cost* £	%	*Mean cost*/ unique copy* £
Commercial	498	56.1	449	18,914.4	38,242.9	66.3	40.6
Learned society	303	34.2	286	8,974.34	16,623.8	28.8	27.4
TOTAL (*All publishers*)	887		799	29,256.8	57,691.6		34.3

* Arrived at by removing multiples cost from total cost and dividing by no. of titles. (Refers to titles of known price.)

TABLE 3: *Harwell periodical holdings by type of publisher*

to various definitions of periodicals and serials of varying degrees of helpfulness. It is obviously a difficult area. For example the Harwell holdings list begins:

AA Guide to Hotels and Restaurants
AB Atomic Energy—Annual Report
ABC Air Cargo Guide, etc. and we are *not* including these, nor the type of news bulletin issued by many institutes. Also ignored are journals obtained either free or on exchange, although these latter are to some extent paid for. Research journals and technical journals and magazines are included and there are inevitably some borderline cases requiring arbitrary decision. For Harwell, this process pruned the overall holdings list by some 50 per cent.

This factor gives us our first conclusion. In the debate on journal prices, library budgets etc, we must take into consideration that a substantial proportion of many library 'periodical' budgets will not go on journals reporting primary results of research. The various elements of the periodicals budget need to be separated before any trends over time can be sensibly discussed.

The most noticeable feature of Table 1 is the relative expensiveness of the Dutch journals. This feature is repeated for Maria Mercer Library, Bristol University and Harwell holdings, where at the latter they represent under 6 per cent of the holdings, but over 20 per cent of the budget. In the main this refers to prestigious primary research journals and any comments on their price would need to be weighed against arguments on quality, size, use etc.

From Figure 1 it is clear that there are five main areas from which these U.K. libraries get their journals, comprising three commercial and two learned society groups. It is also clear[3] that for those publishers within those groups who receive the largest share of the budget the UK market represents a small proportion of their total sales. Nevertheless the dependence, of most European publishers at least, on subscription income, means that they are sensitive to any drop in circulation from whatever region and therefore should be alive to any subscriber reaction or opinion. In times of financial stringency, the most likely area for libraries to cut their budgets is that of multiple copies. For our three libraries, we see that Bristol University Library takes no multiples anyway and any cuts there may follow current user studies. The other two libraries, Harwell particularly, have to deal with scattered sites and have a case for maintaining multiples, but even here one could imagine that this is where 'last resort' cuts would come. We see from Tables 1 and 3 that this would save 24 per cent and 51 per cent for Mullards and Harwell respectively. In fact, Harwell have now begun to cut their multiple subscriptions.

For Mullards and Maria Mercer Physics Library, Bristol University, there is a roughly even split of the budget between commercial and learned society publishers but this split swings heavily to the commercial publishers at Harwell. Taking just the UK and USA, in each library the UK has the larger share of the 'commercial' budget but the US the larger share of that going to learned societies. This is qualitatively in line with the make-up of the physics research journal publishers in the USA and UK respectively, the former dominated by the very large output of the American Institute of Physics.

Lastly, Figure 2 gives an indication of the 'common ground' between the

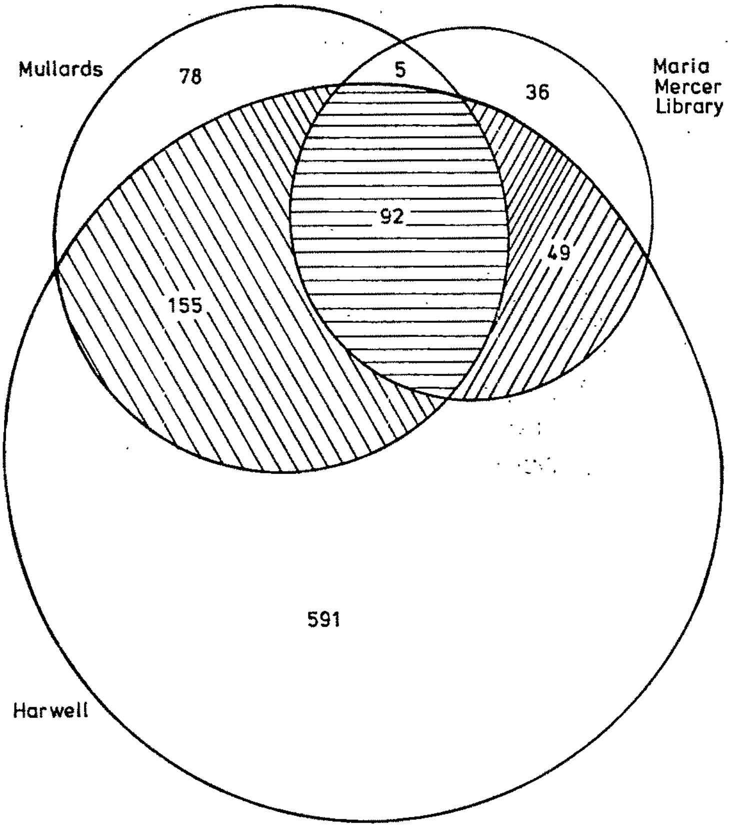

FIG 2: *Indication of the common ground between the holdings of the three libraries. The overlap refers to numbers of titles of journals.*

holdings of these libraries. This shows that just over 1,000 titles were considered overall, most of these being taken by Harwell. Each library held at least 20 per cent of its titles uniquely.

This note, then, shows where the money goes for three physics-related libraries. In their report on cost–benefit analysis in information science, Flowerdew and Whitehead[4] recommended as a prerequisite to a research program 'a study of the resources currently devoted to information transfer so that we know what kind of resources are involved, how much of each is being used, whether they are being deployed by the government, private firms, individuals or other organizations, and on which kinds of information system they are expended'. In the same spirit but on a smaller scale, examining cash flows in one area, that of the primary periodical, shows the variety of type and importance of publisher, and whose activities will have most impact on UK libraries. As examples, if $\frac{2}{3}$–$\frac{3}{4}$ of a library's journal budget goes abroad, the activities of UK publishers may have relatively little direct effect and since, as we have seen, publishers as a whole do not form a homogeneous group, across-the-board generalizations would be particularly hazardous.

Our limited sample may or may not adequately represent the situation in physics. It would be interesting to know whether a similar pattern was observed in other libraries and particularly in other sciences. Could we begin to build up a total picture of 'where the money goes'?

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Librarians or academics? User education at Leicester Polytechnic

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Between 1972 and 1974 four 'Academic Librarians' were appointed to educate students in the use of resources. These were academic positions engaged in full-time teaching and not responsible for library administration. The development of their role and of courses in Information Studies is discussed in the context of the problems which were encountered and the ways in which they have been solved. We have then attempted to gauge our achievements in relation to the aims originally envisaged.

Academic Librarians

The concept of teaching students about sources of information and research methods is based on the premise that this is a skill which they should acquire during their education. Ideally it should be made meaningful by an emphasis on student-based learning during their course. At Leicester Polytechnic a move towards the development of the teaching of 'Library and Information Studies' has been made over the last few years through the appointment of four 'Academic Librarians'.

Teaching in the Library or user education has been thoroughly discussed in journals over the last few years, culminating in the latest contribution by M. B. Stevenson (*Aslib Proceedings* 28 (1), 1976, p. 17–21) written on the actual problems and achievements in specific places. This contribution sets out to remedy that in a small way by indicating the trials and tribulations met with in a polytechnic where the task of user education devolved upon four librarians appointed to academic posts alongside the administrative, non-academic staffing structure of the Library. Some indication of the Library structure has been attached as an Appendix to help readers understand the context and details of the Library system in which we work.

At Leicester, user education was attempted by the Librarian in the 1950s. Three courses were outlined; a 5-hour introduction to the library, a slightly longer course on scientific literature and information methods and a 30-hour course which combined library and cultural studies. Although a start was made and 40 hours' teaching registered in 1959, staff problems intervened to halt progress entirely in 1960. In the years following 1965, new life seemed to be injected into such a programme when the Librarian consistently pressed for teaching staff. In 1972 this came to fruition with the appointment of one Academic Librarian. A second followed in two months, a third a year later and a fourth in 1974.

Aslib Proceedings, 29 (3), March 1977, p. 133–142. Printed in Great Britain

Methods of training students

We set out from scratch to train students to 'think, research and work independently'. The first report in January 1974 shows how widely methods have varied between subject areas. For the statisticians, the hours of teaching and tutorial work recorded for the year 1974/5 were approximately 420 (making an allowance of 57 hours above the actual total of 363, to cover two periods for which figures are lacking). Prior to this no figures were kept for the full year but those for spring and summer 1973 and for autumn 1973 were 145 and 150 respectively.

In the summer of 1974 the Academic Board recommended to all departments that all students should receive some instruction in the use of the Library during their education. It did not specify how much or when during their courses. This was left open to interpretation and the amount of instruction has therefore varied considerably between Schools and even between courses within Schools.

In most cases the Academic Librarians have had to approach Schools to arrange for some form of tuition. In a few cases short modules were written into CNAA degree syllabi, notably in Construction, but only in terms of hours, no course outlines were made. Otherwise there was no time allowed for such classes. Timetables had to be readjusted to cater for any such teaching and before this could be done the Academic Librarians had to contact the teaching staff. This was not always easy. Heads of Schools were formally approached as a courtesy and they usually redirected requests for time to the appropriate members of staff. Heads of sections or course tutors were then approached directly and response, particularly in the Arts subjects, depended entirely upon the attitudes and personalities of individuals. No consistency within Schools was perceptible. An increasing awareness of information problems among technologists contributed towards the willingness to accept Academic Librarians teaching in their courses. But, in science, on courses such as Pharmacy which already include many other disciplines, staff were reluctant to include another item on the syllabus. Informal meetings with staff, student requests and recommendations between staff have helped increase these contacts.

Alternatively, approaches were made for the inclusion of library teaching within the Associated Studies element of many courses. This element is either taught internally in a School, or on a service basis by members of the Humanities School. Class time is still short and relating classes to the main subject of a course is difficult in this context. Moreover there are positive disadvantages in Schools where Associated Studies is regarded as a chore with which it is best *not* to be associated. This approach has therefore been limited to use as either a last resort or an alternative when the course structure is more suited to include library studies, as in the Business and Public Administration courses.

Thesis and project work can benefit from the tutorial system of instruction and this has been attempted in the Faculty of Design and Visual Arts. Attempts have also been made to get Library representation on all Boards of Study. They have met with mixed success other than in the Schools of Building Economy, Architecture and the Faculty of Social Sciences. Some meetings are badly organized and actively against a librarian participant. Boards of interdisciplinary courses are in any case in danger of becoming unwieldy.

It is evident that a crucial point in our acceptance is the attitude of the staff. This has varied according to subject knowledge and qualifications, personalities and the academic staffing levels in various Schools. No overall pattern is discernible. Heavy coursework for a few staff has led to acceptance of our services in one or two areas. But in some Art and Design areas hostility to user education is encountered on the grounds that too much contact with printed and other resources prejudices the originality and innovation in design by such students. Other courses rely heavily on set texts (cf. Open University approach narrowly interpreted) and do not wish students to be made aware of methods of intelligent library use. Our personal contacts, subject knowledge and qualifications have been vital to success in establishing other classes. Personal incompatibility can hinder such liaison, while library help with information required can encourage the trust of other staff in our capabilities. Chance meetings, coffee breaks, lunch time, are the basis of much PR work. In some areas we are accepted by the academic staff as having similar responsibilities. Some early problems were caused by faulty communications and poor understanding of our position and role. As staff attitudes reflect their own level of use of the Library so they also tend to influence their students. Without back-up from staff, students are often reluctant to attend courses we now offer. Some staff in Fashion and in Building, have expressed a desire, not yet realized, for courses themselves to prevent the students 'overtaking' them in their awareness of information resources.

Types of training course

What courses have we set up? When in the student's careers and for how long do such courses run? The answers are again very varied and courses range from a single hour to a 34-hour module for first year Graphics degree students on which they are assessed through their coursework. The Academic Board failed to specify how long library courses should be. It was left open to interpretation by, or to the inclination of, Schools. As such the only time available is frequently during the induction period when students are confused and inundated with new information. They are unable to relate the information imparted to their course. But we sometimes have to accept such timing as better than nothing.

Before indicating the length and content of some selected courses there are a few more general points which need to be made on these topics. The courses can then be seen in the light of the problems created. An inbuilt student resistance to any course not directly relevant to present work militates against second and third year courses other than those scheduled directly before self-directed project, thesis or extended essay work. This can be difficult because time may either not be available in the second and third years or may be insufficient. Some courses already have such a heavy direct-contact load that it would be almost sadistic to add to the burden on the student. No component is usually sufficiently dispensable to make way for library studies, although teaching students to pursue research more independently might decrease staff burdens and save the students' own time.

In the Schools where work is project based and time is allocated in blocks, time-tabling is more flexible but one is as likely to be offered too much time as too little. Ideally project-briefing sessions should integrate fully with student work, but in reality their individual topic needs are so varied that this is sometimes difficult to achieve. Understandably topics are not always chosen with an eye for the information resources available.

Odd hours in a timetable when a member of staff is absent, or for administrative convenience when an urgent problem arises, are sometimes the spot for the Academic Librarian. A quick class on report writing is required by someone, or a talk on the resources in a subject specific area. We take advantage of them all, with an occasional sense of clutching at straws. Sometimes the time allocation is used in trying to break large groups into smaller, more manageable units. Groups of 60 may be split into 6 groups of 10 students and the Academic Librarian repeats the class 6 times while the School tries to redeploy the other 5 groups if it has not already achieved this with other tutorial requirements. It is a physically demanding form of teaching but most suited to the practical work in the Library and useful discussions of resources.

A continuous series of regular classes helps us to establish contact with the students and communicate effectively with the group. But in practice this happens only in a few cases. Odd single classes are harder to integrate with each other and with the main course subjects, especially when timed for Monday morning, Wednesday or Friday afternoon without a compulsory class either before or after to bring the students to, or keep them at, college. We also tend to get unpopular hours such as 1–2 p.m. or 5–6 p.m. Students are never very highly motivated then, even if they come.

Motivation as such is discussed later but the above is not the only factor concerned. Staff interest, compulsion (the level asserted within the school), assessment and even location are factors to be mentioned. A walk to another building is a deterrent, but a necessary one for some classes if they are to be held in a library situation. Although most Art and Design teaching is done in the Library studio there is no space in the Architecture Library and only a limited amount in a corner of the Technology Library. The latter is used as far as possible. Other classes are in rooms allocated to the course on which we are teaching, often far from the Library and unsuitable in terms of arrangement and facilities. Advance preparation is impossible as such rooms are in continuous use. Academic Librarians can also be seen staggering around (and between) buildings with piles of teaching materials or equipment. The transition of classes into the Library for practical exercises thus becomes a complicated manoeuvre always assuming numbers are sufficiently small to carry out such exercises in the first place. However, these are usually most successful.

A rough guide to the organization and content (in note form) of some selected courses is given here before proceeding to attempt an evaluation of our work.

1. **Accountancy Foundation Course.** The Communications course within this was fully integrated. Retrieval techniques, general library instruction and report writing were taught prior to business communications, oral and written. Motivation is high, assessment has helped. Small groups have also been rewarding.

2. **Applied Biology HND** has an introductory lecture followed by practical sessions in tutorial groups on use of the catalogue, reference sources, *Biological Abstracts* and a final summing up session on literature searching to enable students to tackle future projects with a decreasing degree of help from tutors.
3. **Business Studies and Public Administration BA.** Classes are integrated with the General Studies syllabus to give an initial 3-hour introduction following their visit to a factory or local government office and dealing with information resources in these fields. Three weeks later there are 3 hours on library use with a practical and in the second term 3 hours on elementary literature searching. Large numbers are a problem, so is timing. Later, the final theme is developed prior to third or fourth year projects when a detailed consideration of search procedure and resources is undertaken.
4. **Chemistry, the BSc.** Applied Chemistry course is taught via the Associated Studies element. In the first year the aim is to equip the student to use the library more intelligently and in the second year to equip him for his fourth year project or his work in industry. Topics covered range from use of catalogues to *Chemical Abstracts* and *Beilstein's Handbuch* . . . not forgetting trade literature, company information and unpublished sources. The Royal Institute of Chemistry has instituted a 60-hour module on information and communications in its GRIC course. This has 30 hours on information sources and systems, report writing and giving technical talks. The rest are available for practical searching and the planning of assessed work.
5. **Construction** subjects have overcome some problems through close staff liaison and more flexible timetabling. Time for library instruction was written into several degree syllabi. A basic outline is adapted to specific subject courses. It covers general library use in terms of the catalogues, indexes, and reference materials of the subject. Indexes and abstracts are brought in at a later stage. Product data and classification are covered and in the second year are developed to include construction information systems, standards, government publications, statistics and other 'special' materials. Some classes become informal when tutorial problems are brought forward by students.
6. **Design and Visual Arts** courses have generally lacked rigid timetabling. Course content has usually rested entirely with the Academic Librarian although pre-project classes do have an obvious 'brief'. The syllabus varies greatly. All students receive an introduction to the location, contents, arrangement, and services of the Libraries, an explanation of catalogue and classification with a brief tour of one or more Libraries. Subsequently the priorities are the literature of the subject (types, characteristics and uses), secondary materials, reference materials, unpublished sources. Initial contact in second and third years creates problems in gauging the students' level of knowledge and expertise in order to pitch the instruction at the right level of interest but follows a similar pattern. Project briefing sessions are normally geared to tracing specific technical data.

7. **Educational Studies** derived a syllabus in close consultation with the academic staff but with insufficient time allowed. Two 1-hour sessions covered all introductory material, bibliographic citation, literature searching, reference material, selection of non-book media, and a tour of two Libraries!
8. **Electronic Engineering BSc** first year, receive an introductory course similar to Biology within their Communications course. Not only do they gain help with literature searching but also with locating information for a short talk later.
9. **Graphics BA** course is a compulsory assessed course for first year students with a fully developed syllabus. In the first term this is introductory covering basic skills and the examination of primary material. In second and third terms secondary materials for literature searching, reference materials, official publications, unpublished sources, methods of documentation and personal information systems are covered.
10. **History of Art BA.** A 10-hour outline did not run as planned. Instead four fragmented sessions were arranged, general information and a tour, catalogue and classification use, the literature of the subject, and literature searching techniques.
11. **Combined Studies BSc.** In their final year students have an advanced literature search session prior to projects. This is a large group and sometimes a general lecture is given with plenty of handouts and then tutorials offered to individuals to cope with vastly different subject topics.
12. **Mechanical Engineering BSc** is a part-time course in which the initial Communications course has an information retrieval module where students retrieve documents, extract information and write a short report.

Although we have tried to evaluate our work fairly it is always difficult to assess success in this kind of teaching without holding actual discussions or circulating questionnaires for measuring performance in some way. Yet these too have their drawbacks. Achieving frankness in discussion and the artificiality of questionnaires are drawbacks. On a few occasions lively seminar evaluation of classes has proved rewarding. An hour-long feedback seminar with a School of Education mature student group was successful as were impromptu short sessions with Accountancy and Business Studies students. Few staff have really discussed the quality of main coursework with us. A higher standard there would reflect success. In a couple of instances this has been seen. Thesis work has reflected better bibliographic standards and reports indicate a degree of literature search undertaken beyond the usual level expected.

However, intelligent use of resources remains the hallmark of a minority of students. Perhaps it is a growing minority? There has been a marked increase in the use of the Library. Quantitatively, issue figures are up and seating space is at a premium. The facilities of the new Library will be much appreciated next year. Intelligent use can sometimes be observed. Some of the questions asked indicate that some of our work has reached the students' conscious level of inquiry. The students know where to find an answer and can phrase a question more successfully.

Inevitably this has placed a strain on library resources, highlighting the weaknesses. The establishment of what is potentially a highly sophisticated programme of exploitation was questionable when the basic library service, staffing and stock were not fully developed owing to a continuous lack of professional staff over many years. Thus supporting bibliographic and reference material is sometimes poor, *i.e.* insufficient back files of abstracting and indexing journals. Discrepancies in cataloging and inadequate subject indexing have become apparent, as have the inconsistencies between libraries. The inter-library loan services cannot cope with the increased demand which is itself a reflection of intelligent and increasing use of resources.

This problem also throws into relief the anomalous position of the Academic Librarians who are unable to do anything to rectify such points because of their position outside the day-to-day running of the library and whose popularity is unlikely to improve by pointing out such things. Initially the differences in our conditions of service, salary scales and work styles made some degree of strain in our relations with other library staff inevitable. Personalities are of primary importance. Sometimes our responsibilities appear to overlap as in the sphere of book selection. In actual fact our role is supportive rather than primary here. Inevitably though, practical classes and use of the library not only create work, but hinder some normal duties such as card filing.

To continue to encourage student use of the library we have stressed information and tutorial work in the library. This means availability. In some areas teaching hours have not been so high as to preclude this but experience in construction and business studies subjects has shown that teaching commitments can be incompatible with tutorial presence in the Library. In particular the changed approach to many enquiries is emphasized. The 'here it is' approach is now giving way to the 'this is how you find it' approach. But if we do too much of this work there is a sense of loss to the other professional librarians since they are losing what is recognized by most as one of the more interesting and demanding professional activities.

Introductory tours and talks have increased the demand for such tutorial work. This might perhaps leave work for all to do especially since only in two libraries, Art, and Architecture and Building, are our desks conveniently situated near the main concourse. But we are preaching to the converted. We are also subject to continual interruptions which are not conducive to the preparation of classes. Yet this is a necessary feature of our work.

The demand, however, does indicate that students want help. They will ask for it when and where they know it is available. At other times library use *per se* is not well received. Its reception is only enhanced when placed in the context of industrial or coursework needs. Mature students thus often recognize the need and are rewarding to work with, as in the Management course.

Level of attendance

In some Schools a high level of attendance at classes is expected and achieved. In others slackness is permitted. Our classes reflect these levels. Compulsion, assessed course work or examinations compel some attendance (not necessarily full attendance) but induce rebelliousness unless relevance and good timing within the course stimulates interest. Yet how do we do this? Interest is so closely related to attendance that somehow we have to stimulate the first initially to maintain the second throughout. Methods vary.

Practical work is often popular as students feel it brings out the problems and puts instruction into perspective. Lively seminars are hard to develop but can be rewarding experiences. Practical work is demanding of preparation and of tutoring during the period. But if students already have very heavy coursework or lecture timetables then these will all fail, unless some short cuts are offered towards the completion of other tasks. Gearing work to essay needs is popular.

In the presentation of material we also try to stimulate interest. Various methods have been used. We have slides of the library and of materials which have been used, especially with introductory talks. Films are welcomed. Tape/slide presentations are useful but often prove too long. Use of the overhead projector is fairly standard in science, technology, social sciences and construction, while in the Art and Design area especially, teaching in the Library permits heavy use of materials, displays and inspection sessions. Elsewhere we do try to use materials but again although the students appreciate it, transportation sometimes militates against it. Having sufficient copies of some works for practical sessions presents a problem. Superseded material is being collected but although cumulated editions soon give us adequate supplies of serial bibliographical tools, other standard reference works will always remain in short supply. Storage also presents difficulties until we have purpose-built classrooms in the new Library.

What we collect also reflects what we teach. Therefore it might be appropriate to indicate how we keep the content of instruction related to the student's individual course. So far we have only mentioned motivation in the context of presentation and timing. Something has also to be done with the material presented. This demands either a strong subject background or firm connections with the subject area which have developed the bibliographic knowledge. We have all achieved some of these. In Graphics, studio project topics were brought into the course and in Estate Management a literature search was conducted in parallel with an essay topic. The one was not very successful the other achieved the missing motivation. Complete subject integration with other courses has been rare. Chemistry subject knowledge has helped considerably and the Accountancy Communications course has successfully integrated two elements. But other attempts have suffered from the diverse needs of a single group of students. Although a balanced syllabus in library and information studies is usually presented for courses, subject integration often prevents its full implementation. However, having said that, no two courses are the same. The separate needs of subjects dictate their content.

One drawback here has been the need for exact knowledge of the progress of the course. Some lecturers are helpful with this planning but not all have time. We are left to rely on our own resources and interpretation of the syllabus which may not always be accurate. The exceptions have been in the School of Educational Studies, where a member of staff had previously been undertaking the work, and in the School of Biology where future projects were reflected in library practicals. Such staff co-operation furthers integration. Staff attitudes and personalities have thus again come to the forefront of this consideration, indicating how much our work relies on their attitude. Their encouragement to students can be everything, or nothing. Not all staff realize that we do not affect student staff ratios (SSRs) and this does affect their attitudes to our teaching.

Economies in staffing and the occasional poorly supported courses also react both for and against our work. Obviously when our work has been already undertaken by members of staff (Maths, Law and Education) we are not warmly welcomed. Lawyers feel that only they can give information instruction in their field and not a librarian unless he/she is law trained. However, time will tell and one point working in our favour is familiarity. As we get to know our customers so we can work with them more comfortably.

Conclusion

Thus, though we are developing user instruction in a Polytechnic where traditionally courses are practical rather than book oriented, the style is changing slowly. Universities developed the field earlier with book-based learning techniques. Polytechnic subjects present problems to the Academic Librarian in that their bibliographic structure is often inadequate. Non-book courses are not initially susceptible to instruction in information resources but the general recognition of the value of the information in government and industry, which both rely on adequate supplies of information in an increasingly complex economy and society, is heightening the general awareness of the need for information. Consultation and information are becoming public concerns and thus we are preparing students for their everyday life as well as their course needs.

APPENDIX

Background information on Leicester Polytechnic Library

In 1977 a new central Library will be completed. The plans include three classrooms, or four seminar rooms and one classroom, which will have teaching collections to augment the general stock. This new Library will unite the three present libraries under one roof. Meanwhile each Library serves the needs of the building in which it is situated.

Art Library	Faculty of Design and Visual Arts, History of Art, and School of Humanities (Literature)
Technology Library	Faculty of Business, Social Studies and Law, Faculty of Science and the Faculty of Technology (except Construction)
Architecture and Building Library	Schools of Architecture and Building Economy from Faculty of Technology

Some services such as inter-library loans are centralized, and systems are being rationalized for 1977. Each Library is run by a Senior Assistant Librarian with a varying number of Assistant Librarians with professional qualifications but not subject ones. However, long service compensates for this.

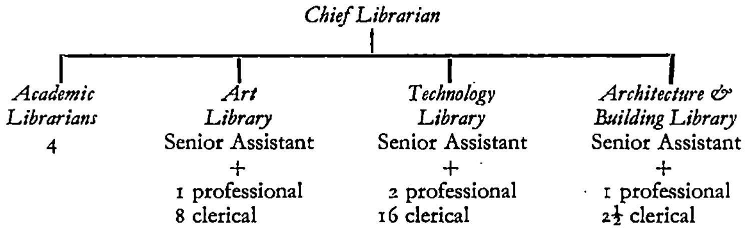

FIG 1: *The relationship between the Academic Librarians and the Assistant Librarians.*

The Academic Librarians' subject responsibilities correspond roughly with the four faculties. Each has a desk in the appropriate library. Those in Art and Architecture and Building are by the main desk but in Technology they are practically 'behind the scenes' and although they receive some enquiries from students directly, others are referred from the desk. The Art Library has a studio area which can be partitioned off as a classroom. Technology has a very small audio-visual area which also has a partition and can be used for very small classes (maximum 10). There is no spare space in Architecture and Building.

Courses in the Polytechnic range from HNC to PhD and the institution has retained a high percentage of part-time and sandwich courses. We teach in many of these, although work tends to be concentrated at HND, Degree and MA level and at present mainly on full-time courses, although some successful approaches have been made on part-time courses.

April 1976

BRIEF REVIEWS

FEBVRE, L. *and* MARTIN, H. The coming of the book: the impact of printing 1450–1800. Translated by David Gerard. London: New Left Books, 1976. 378 pp. £12.00. (SBN 902308 17 3.)

This book first appeared in France in 1958. As Febvre writes in the preface this is not a history of printing but an explanation of the book as one of 'the most potent agents available to western civilization for bringing together the scattered ideas of representative thinkers'. The introduction of paper into Europe is traced up to the development of the printing industry. Paralleling this are details of the technical problems and solutions, e.g. the making of type and composition. The development of the physical appearance of the book, illustration and binding, is linked to social change. The chapter on the book as commodity is followed by one on the little world of books which describes the work of journeymen and the problems of writers and owners. The geography of the book is described with the aid of two maps showing the spread of printing across Europe and across the world. The book trade is investigated via book fairs, banned books, business methods and sizes of editions. The concluding chapter, the book as a force for change, discusses the book as agent, the effect of a large number of accessible texts, the subject matter, language and the book and the Reformation.

HOLT, R. M. *ed.* An architectural strategy for change: remodeling and expanding for contemporary public library needs. Chicago, American Library Association, 1976. 149 pp. illus. $12.50. (ISBN 0 8389 0210 3.)

This book is made up of the proceedings of the Library Architecture Preconference Institute, New York, 4th–6th July 1974, sponsored by the Architecture for Public Libraries Committee, Buildings and Equipment Section, Library Administration Division, ALA. Remodelling and expanding for new services is illustrated by the Martin Luther King Memorial Library, the Rosenberg Library, Tulsa City–County Central Library and the Tenzler Memorial Library. Problems range from the misuse of daylit areas (used for book storage rather than office space) and inadequate lift provision to more general problems of traffic flow and the need to make the library an entity in itself. Copious plans and photographs are included; 'before and after' details are supplied. Session 3 is a panel discussion between experts in various fields of building design on basic problems such as built-in obsolescence and the ever-increasing need for new services and more space to house them. Session 4 is devoted to informal laboratory workshops on individualizing the remodelling problem; the workshop reported concentrated on the implications of media and audio-visual services for library buildings. In Session 5 remodelled and expanded buildings meet their critics: a description and critique of three recently treated libraries is presented by the librarians concerned and again there are plans and photographs. The last session is an analysis and summary of the Institute provided by the Editor.

MALTHA, D. J. Technical literature search and the written report. London: Pitman, 1976. 175 pp. illus; refs. £5.00. (ISBN 0 273 00399 2.) Translated by J. C. Rigg.

Translated and adapted version of a book originally published in the Netherlands in 1972, by Pudoc. The bulk of the material is from the author's lectures to students at the Agricultural University. The background or information chain is seen in past, present and future terms. The author begins with the purpose of a literature survey and reviews some organizations for tracing literature. A literature survey should begin with secondary publications and bibliographic sources carrying on to primary publications and the possible use of current awareness services. Literature retrieval is discussed generally and systematic searching guidelines are given. The three methods of recording information, in reports, in card systems, in abstracts, are discussed. In Chapter 7 the writing of a literature survey is illustrated as an example of report writing. Basic rules are suggested, use of illustrations, footnotes and general guides for readability. A list of standards and guidelines for different types of document is given. The research report has a chapter to itself with emphasis on systematic composition for user comprehension. Subheadings are: scheme of research and report; report on research and its method of analysis; defining the problem and expression of numeric data. The concluding chapter looks briefly at the dissemination of research results. This is a good introductory book even if *Forthcoming Scientific and Technical Conferences* is accredited to the D.E.S. instead of Aslib.

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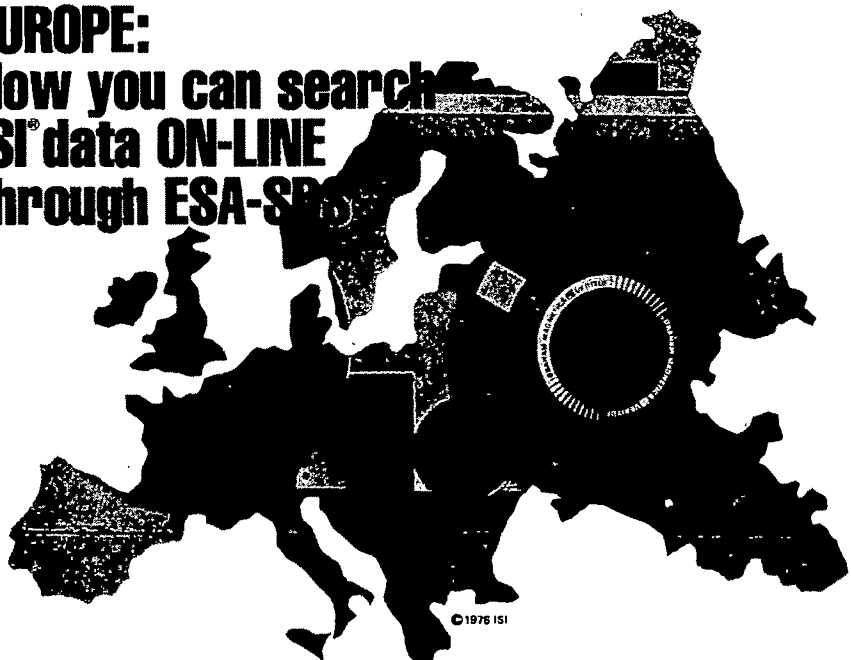

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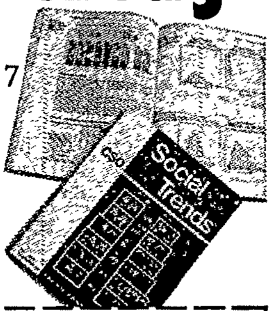

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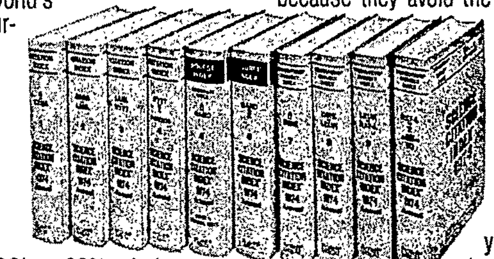

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VOLUME 29 APRIL 1977 NUMBER 4

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Library liaison with social scientists: relationships in a university context

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A reassessment of the basic relationships between the university librarian and the library's users with particular reference to the social sciences. The interplay of the librarian's attitude and the reader's motivation is examined against the background of subject specialization, with special attention paid to the problems of the undergraduate dissertation (an experiment involving individual as well as group instruction is described). Increasing interdisciplinarity is seen as posing problems for relations between the social scientist and the librarian. Examples are drawn from experiences at the University of Bradford.

Introduction

THIS ARTICLE is based on a paper presented to the SCONUL Exchange of Experience Seminar in Social Sciences held at York in December 1975. At that seminar there was a feeling that, amidst the attention paid in recent years to new developments in the management of the library as a system, we are tending to neglect reappraisal of our basic relationships with our users in the personal sense.

An indication that librarians may not have been devoting sufficient attention to the nature of this relationship is the persistent lack of an adequate expression to define it in such a way as to be publicized to library users. The phrase 'user interface' is beginning to establish itself in the jargon of librarianship, but it is hardly the type of term to get our customers clicking through our turnstiles.

On examining my own library's publicity about its services I was reminded that the relationship between ourselves and our users is one of 'active liaison'—a phrase conveying something of our purpose, but still having a rather off-putting ring to it. Subsequent discussions with some of my colleagues provided no real clarification, as words to describe this relationship were considered and discarded in turn: the word 'service' implied the idea that the customer is always right; the word 'consultancy' was far too elevated and patronizing.

As a result of this inability to describe adequately the relationship between ourselves and our users, I realized that if this fundamental relationship is indeed so difficult to define, then perhaps it is a topic worth reappraising, even if the following observations are mainly confined to experiences undergone in a particular library—that of the University of Bradford—by one whose responsibility within that library is specified broadly but solely as the establishment of fruitful relationships with and provision for the information needs of specific groups of library users within the human sciences. Much of what follows will be applicable to a broader disciplinary range of users than social scientists and I shall be using the term 'social sciences' in its broadest possible sense.

Aslib Proceedings, 29 (4) April 1977, p. 146–157. Printed in Great Britain

Although it is rightly said that the performance of a library is judged by its users mainly in terms of its stock, I want to concentrate rather on the personal aspects of the relations between librarian and reader and upon what I recognize as the fundamental facet of each party: on the one hand, the personality or attitude of the librarian and on the other, the motivation of the reader, which, in a university context, is crucial, whether at the student, research or teaching level.

Librarian's profile

One of the major difficulties facing the university librarian in his relationship with his readers, whether at student, research or teaching level, is the nature of the institution itself. The following may be a generalization, but the public librarian, although he can identify and meet the need for specialized subject services, nevertheless knows that in the long run he has a general readership to provide for; the special librarian usually has the advantage of providing for a specialized readership broadly interested in the same subject fields; the university librarian, however (and this is particularly noticeable in the context of the social sciences), has to provide for what amounts to a general readership of several thousand, which at the same time consists of numerous small groups, or even individuals, each with their own specialized interest.

The question of that particular type of librarian which university libraries have been increasingly introducing in this context, namely the subject specialist librarian or information officer, has already been well represented in library journals[1] and I shall not be treating it *per se*. Suffice to say that, in my experience, the most active examples of this system have revitalized both the library's and the users' approach to the identification and resolution of informational problems; this comparatively recent and welcome development will, however, form a backcloth to the rest of this paper.

If we manage to convey to our users the impression that we know what we are doing in the general professional sense, can we also sustain a claim to a subject competence which, I hope to show, can make it easier to gain the confidence of the specialist reader? For although one librarian may be professionally competent 'across the board' as far as the major literature of the social sciences and its associated bibliographical problems are concerned, it is obviously going to require a team of subject-qualified librarians in numbers far exceeding the financial resources of a university in order to provide a credible coverage, in academic terms, which represents each of the relevant disciplines and especially the interdisciplines.

At this stage it may be helpful to set out the statistical framework for Bradford University: the library has a potential readership of nearly 5,000, consisting of 500 academic/teaching staff, over 100 research staff and 4,200 students (3,500 undergraduate, 700 postgraduate); the total library staff numbers 55 including 24 professional posts, of which 10 are filled by subject specialist librarians (4 sub-librarians and 6 assistant librarians)—the senior subject specialist librarians are responsible overall for the library needs of each of the four Boards of Studies within the University, i.e. Engineering, Life Sciences, Physical Sciences and Social Sciences and with the librarian and deputy form the internal consultative policy-making committee of the library.

The Board of Studies in Social Sciences, which itself contains 12 Schools or departments, has 162 academic/teaching staff, 50 research staff and 1,100 students (900 undergraduate, 200 postgraduate); the library considers itself fortunate in having been able to establish a team of four subject specialist librarians for the social sciences alone (a ratio of one librarian to 300 readers) each of them engaged full time on information work in the fields for which they are responsible and each with a different academic subject background and qualification which is relevant to and neatly reflects the four main streams which we can identify within our Board of Social Sciences: languages/area studies, social studies, humanities and business studies. But the full range of subjects studied within any one of these streams obviously cannot be mastered in the academic sense by one person, librarian or otherwise.

Yet there is a case for saying that to obtain the full confidence of our users it is almost as necessary for the subject librarian to be familiar with the important facets and certainly the terminology, of each of the subjects in the field for which he is responsible, as it is for him to know its bibliography. Is it really too much to expect that the librarian responsible for the information needs of the linguists in the University, for example, should be able to extend a sound knowledge of perhaps the two languages that he graduated in himself to at least a working or bibliographical knowledge of the two or three others that may be in the department's language syllabus? Perhaps this may sound rather utopian, but if a reader has been invited to a session with the relevant librarian on retrieving information about, for example, the concept of the grand tour in the eighteenth century, professional rehabilitation of the disabled, or the theory of workers' self management in Yugoslavia and finds that he has to define not only his search but also his subject from scratch for the benefit of the librarian, this makes for a slow start; but if the librarian is in a sufficiently informed position to be able to talk round the problem itself as well as to assist in conducting the literature search, then the extra rapport with the reader is very noticeable. In short, a portion of the specialist librarian's time spent on reading around the subject fields for which he is responsible is time well spent—this is perhaps easier to achieve in the humanities/social sciences context and is of course not an irksome activity.

Just how important is the academic profile of the librarian? Does its importance represent merely a desire on the part of the librarian to push for academic status (already granted in many universities) by publicizing the fact that he may have a combination of academic qualification and professional expertise on which other members of the University may find it useful to draw? Our experience shows that there is a more relevant and successful purpose behind it. I am not suggesting that we overplay this aspect, but there is certainly room for being more positive. Let me consider how this approach can produce a generative effect in our relations with the three main categories of user mentioned earlier.

Liaison with academic staff

In the case of the working relationship between the subject specialist librarian and the relevant teaching departments, I am advocating at least a personal acquaintance with all the members of their teaching staff. One can, of course, solicit interest profiles of lecturers on a formal basis[2] and this in itself can show that the library is interested in their work, but there is no need to wait for the lecturers to come to the library to establish such relations. If the librarian is participating in the extra mural activities in the university, there will be the opportunity for a less formal contact: the Senior Common Room, for example, provides a fruitful atmosphere for mixing with teaching staff and subsequent conversation can be directed towards learning more about a lecturer's interests and teaching plans. A chance remark by a lecturer can often be an opportunity for the librarian to provide him with an unsolicited and therefore more appreciated piece of relevant information at a later date.

To help further the library's attempts to portray itself to its users as an active exploiter rather than a passive conserver of information resources, it also pays dividends for the subject specialist librarian to become a full member of the relevant schools of studies, or departmental teaching committees (if the ground has been properly prepared this may be accomplished by invitation instead of application). Such meetings can be tiresome, but not only is it useful for the library to be able to gain advance notice in this way about, for example, new courses or research projects, but it is also a good thing that the library is seen to be participating, though not meddling, in the affairs of the teaching departments. On several occasions at Bradford this has gone even further, in that the librarians have been asked to give lectures, not only on library use and information sources, which we would do in any case, but on their own particular subject, where they retain a certain speciality which is relevant to the syllabus; this can bring the librarian closer both to the lecturer's point of view and to the problems of the students themselves. This form of liaison can also lead to a librarian being attached to a particular research team, where that team has recognized that an important feature of research methodology is information retrieval.

An important part of our approach should be to determine in advance from the university registry, or from the departmental secretaries, how many new staff are taking up a post at the university in the next session; also, who they are and on what date they will be arriving. Amongst the first batch of correspondence handed to them on their arrival there should be a letter from the appropriate librarian, welcoming the new member of staff to the university, introducing himself and suggesting a meeting within the next few days to discuss the lecturer's teaching and research interests, as well as the library's resources and activities and how they can be applied to his own requirements. It is particularly important that any new professor be contacted at this early stage, as our experience has shown that professorial attitudes towards the library, whether positive or negative, are often reflected down to the members of his teaching staff. At this stage the motivation of the user is beginning to dovetail into the attitude of the librarian, and I shall return to this aspect when considering motivation.

The library must not fall into the trap of thinking that the university consists of only two categories of user—lecturers and students. A third group, consisting of research workers, is smaller in number but makes up for that by its high use *per capita* of library facilities. Again the motivational aspect is significant here, and the library's attitude must, whenever possible, be to treat them as individuals or teams, rather than as a category—the subject specialist system is suited to this, and the INFROSS project results should by now have been taken to heart and applied wherever possible.[3]

It is not because they are our least important group of users that I have so far postponed the question of our relations with undergraduate or course students. Too often one hears that it is relatively easy to meet the library needs of undergraduates and that the more difficult work of providing for research needs is what should be exercising the time and skills, even the enthusiasm, of the librarian. Perhaps it would be truer to say that this view is unconsciously accepted rather than explicitly expressed, but the overall result is the same and can be dangerous. It is one example of an intrinsic fault in many libraries, namely our concentration on innovations and advanced techniques before we have put the basics of our house in order; it happens with cataloguing and classification, it happens with mechanization, and it can happen with the resources and facilities which we provide for our users. Complacent, indeed, would be the university library which consciously claimed to be meeting all the problems faced by its undergraduate users. Perhaps it is an impossible task, but they are our largest and most vulnerable group of users and cannot be regarded simply as readers who will be satisfied so long as the books on their reading lists are in the stock of the library and whose muffled complaints about lack of multiple copies can be dealt with by pleading financial restrictions, by reminding them of the proportion of their student grant that is supposed to be spent on buying basic texts, or by establishing short-loan collections. The separate 'undergraduate library' should be conceived as a positive additional facility and not seen simply as a means of hiving off mass student demand from the main collections, supermarket style.

A librarian cannot be expected to know each of the students in person—they will still be a group, or series of groups and this is why they are vulnerable. Their needs and their failures are not as easily ascertainable by the librarian. Surveys and questionnaires have their place, but can perpetuate the sense of remoteness by their very nature and are not always well received by students, particularly if, in these financially restrictive times, they suspect that the results may be used as evidence to support cutbacks rather than extensions of library activities.[4] Formal tuition in the use of the library is one way of making small group contact, but this is usually a one-way process unless written work is submitted by the student, *e.g.* in the form of answers to bibliographical questions. What can be valuable is a following-up session in which the students can be encouraged to take the initiative in saying what they think the library should be doing for them and where they think it is failing. Even if some of their problems are difficult to resolve, the students can be made aware of the library's own problems and often good ideas can crop up, which can be acted upon. It is a good idea for a student representative to be a member of a library committee.

Reader response and motivation

So far, I have been emphasizing the attitude and personality of the library, but of course the sort of relations I have been describing must involve a two-way process. The main stimulus to us from the users' side is their own motivation. The process is even more of a mutual nature, as the library can produce the motivation in the user by its attitude in the same way as the user can affect the attitude of the library by his motivation.

One of the most dangerous assumptions which the library can make, even unconsciously, is to think of its student users as a homogeneous group. There is, I suppose, a degree of inevitability about this because of their large numbers, their regular three or four-year turnover, their age equality and the similarities of their course structures. But as far as their approach to the library is concerned there are marked individual differences. Some are genuinely self-sufficient in using libraries at the level of their needs, some think that they are, some know they are not but do not like asking for help, and others could not careless, relying on lecture notes rather than library books. If we look at this problem in the context of tuition in the use of the library (I am assuming that time has been set aside for this during normal timetable hours—at Bradford we have incorporated library instruction into the formal regulations of the University),[5] the difficulty with group instruction of students is knowing at what level to pitch an introduction to the topic. An hour devoted to the purpose and use of the catalogue, for example, can produce a variety of reactions on the part of the students: some may feel that this basic statement of what a catalogue is and how it works is a questioning of their common sense—they are quite used to public libraries, they may say; others, even if they manage to grasp the idea of a catalogue, are still incapable of retaining a sequence of more than three letters of the alphabet at a time if they begin to search through the files. This latter group is, unfortunately, less likely to ask for help. Again, one student looking for references to articles on a psychological topic will grasp the concept of a service such as *Psychological Abstracts* quite quickly; a second student in the same group will not only have great difficulty in understanding what an abstracting or indexing service can do, but may ask what a periodical is, or even a reference.

In view of the large number of students and handful of library staff, is there anything we can do to overcome this basic problem of student differences in adaptability? My optimism is commensurate only with the degree of motivation or persistence possessed by the student. I say this for the following reasons: if the structure of first degree courses preserves its traditional features of an intermediate and a final examination on which all depends, then the student formula of reliance on lecture notes and on basic lists of recommended reading from lecturers (some of whom, if the librarian is not vigilant, may be dispensing lists ten years out of date) is bound to produce a low level of library awareness and motivation in the student; some may display a little sense of adventure by browsing outside this straitjacket of prescribed reading and into other parts of the library's collections, particularly in the case of a social sciences and humanities collection. But the threat of examinations will continually be pulling them back to the straight and narrow.

The undergraduate dissertation

However, during the last decade or so, there has been the gradual appearance, among some newer universities, of cracks in this traditionally solid structure of syllabus and examinations. As the nature of the social sciences, including the humanities, has become increasingly interdisciplinary, so has the syllabus become more free and begun to offer more choice in terms of how a student may approach his subject. This sort of option has, in its turn, allowed a gradual but significant shift of emphasis away from the once and for all examination towards a system of course work and continuous assessment. The weekly essay is being consolidated into the extended project and into the concept of the undergraduate dissertation, which may be expected to occupy part of the student's attention for a year or longer, and which may count as being equivalent to a couple of papers in a final examination. Most important of all, he is encouraged not simply to read the standard books on a detailed topic of his own choice within the subject framework and then to regurgitate it for inspection, but rather to seek out and evaluate a much greater range of information and then to superimpose some original ideas of his own. In short, we are beginning to witness the emergence of embryonic research at the undergraduate level and the significance of this for the library is twofold: first, the motivation of the student is more apparent, not only because he is working on a detailed topic in which he is interested through having selected it himself but also because he is going to need and have time for a more systematic use of the library's resources. It is at this stage, too, that he is going to be made to realize that his sphere of information requirements is not confined to the library of his own university. This development provides the librarian with the opportunity to redress the imbalance of attention as far as the undergraduates and their use of the library is concerned. I would like to describe an example of how we are approaching the question at Bradford.

Investigating the problems

Although we have tried for some years to devote special attention to those students with dissertations to write as part of their course, by means of formal lectures on information retrieval with audio-visual presentations of literature searches, etc. last year, as a result of the particularly strong liaison which has been established between the library and the largest School of Studies within our Board of Social Sciences, it was decided jointly to investigate more thoroughly the problem of the undergraduate dissertation. The School formed a dissertations committee, composed of various lecturers who act as tutors for dissertations in a specialized field and invited the subject specialist librarian most concerned to become a member. The School in question is the Undergraduate School of Modern Languages, a department devoted to interpreting/translation and area studies rather than to the traditional language and literature syllabus. The total number of students in this School is about 300, or around 75 in each of the four years of the course. The third year of the course is spent abroad, improving linguistic ability by working in firms or at educational establishments and collecting material for the dissertation, which can be either of a linguistic/literary nature or social sciences/area studies based, The dissertation is to be of at least 12,000 words and must be written in the language of the country concerned. It is separately assessed for the honours degree and has the effect of pulling up or pushing down the class of degree awarded on the basis of the final examinations. In other words, it is a very important piece of work as far as the student is concerned and one in which he will be relying on his tutor, the library and himself, in roughly equal measure.

The first stage was to assemble the students in their second year at a full day session. The seventy students in this group were on the point of selecting their dissertation topic and within three months would be leaving for the year-long placement abroad in France, Germany, Spain, the Soviet Union, Romania or Yugoslavia. The programme was divided into six parts. The first part was a talk by a member of the Modern Languages staff on the choice of topic and the importance of choosing one where there is likely to be sufficient background information for the student to orientate himself and yet not so much as to swamp him and discourage first-hand observation, analysis and original work (the librarian to advise upon this). The second paper, again by a lecturer, was on the logic and basic techniques of writing a research project.

At this point the library was integrated into the programme by its presentation of an hour-long demonstration of a literature search on a specific dissertation topic; to give this demonstration an air of credibility, its preparation had been firmly based on the experience of a particular past student who had come into the library with a dissertation topic, not knowing how to start a search for information and who was eventually despatched armed with a systematic list of a hundred references to follow up before he went abroad. As the student had participated in this literature search and was embarrassingly grateful for its results, he had agreed to help the library in recording his experience of the search in the form of a dialogue between the student and librarian, with slides taken of the various bibliographical aids which had led to his own bibliography. It was this illustrated dialogue that was re-enacted before the group of students, with the caveat that if they found the many titles of the bibliographies, abstracts, and indexing services somewhat bewildering, they should not worry about it for the moment, as the main object of the exercise was simply to leave them with the impression that even on an esoteric topic it is possible to retrieve information on a systematic basis and that the library can help in this respect. The fourth contribution, also by a member of the library staff, concerned bibliographical presentation of the finished work, citations, maps, indexes, etc. A subsequent session was devoted to the problems and use of libraries in the countries where the students were to be placed. Finally, two students from the fourth year who had returned from abroad and completed their dissertations held a 'question and answer' session on their own experience of collecting information and presenting it in the final form. Their presence was also useful for the library's participants in helping us to perhaps tone down some of our more idealistic notions about the successes of literature searching.

The feeling persisted that this had been essentially a group session; that we might have got something across to seventy students as a whole, but that they were all individuals who were going to choose highly different topics—our demonstration literature search had been concerned with the social aspects of north African immigration into France since 1945, a French social science topic, but other students would be choosing German, Russian and Spanish topics of which some might be linguistic or literary. Each student, therefore, was invited to make an appointment to see the subject librarian responsible for languages and area studies to discuss his plan and define his own topic in detail (some students seemed glad of the opportunity to ask for a second opinion) and, this time in the library itself, to be guided through some of the potentially most profitable information sources in his or her field and language; also to be forearmed with some knowledge of libraries and resources in the particular town or region where they were to be placed.

Results

The immediate response was somewhat overwhelming: almost 80 per cent of the students (56 out of 72) took up the offer and the librarian's diary took on the appearance of a dentist's appointment book as he juggled to fit 56 individual sessions of 1–1½ hours into a three-week period before the end of term, to the exclusion of amost every other daily activity! A fair proportion of the momentum was observed to be maintained: students were to be seen each day consulting even intricate bibliographical services such as *Internationale Bibliographie der Zeitschriften Literatur* or *Letopis zhurnal'nykh statei*, sometimes on their own, sometimes in pairs. Twenty of the students wrote direct to the same librarian from abroad, giving advance notice of problems which they had encountered in acquiring particular items which they hoped we might be able provide in time for their return; on their return many students voluntarily reported to the librarian, often armed with useful points of information about the libraries or other organizations which they had visited in the course of their placement, which the librarian was able to record for the benefit of any future student who might be placed in the same area.

In view of the degree of personal contact achieved and in many cases maintained by this exercise it was felt that as a pilot project involving the students of one department it was worth trying to repeat as a regular commitment. Other subject departments are beginning to express an interest in similar programmes for their own students, the practical implications of which are rather desperate in terms of library staff time and may call for a cost–benefit analysis of that part of the programme involving individual appointments with students.[6] But our feeling is that having discovered a strong motivational factor amongst our largest group of users we should stretch our resources to the limit to encourage it and that, although it is difficult for the librarian to wear the mantle of a personal tutor, it may be worth examining the value of some of our traditional and perhaps unevaluated activities in the light of a now known demand.

Returning to the research worker in the social sciences, he is perhaps our most responsive user in that his motivation is high from the start. It is a cliché that the social scientist's laboratory is in most cases his library, but it is something that the library should not forget. Although he is often more self-sufficient than the undergraduate, nevertheless, being free from the giving or attending of lectures, his time and effort outside his fieldwork will be devoted to the library. The library should have an interest in what he is doing, and it is a good idea for the relevant subject librarian to obtain from him a fairly detailed statement of the field of his research as a basis for action. It does no good to have a research worker going round the departments saying that the library cannot support his research—it is up to us to take the initiative and this presupposes an acquaintance on the part of the librarian with all the research projects within the field of his responsibility.

Finally, to return to the teaching staff. They, too, present their problems in terms of library awareness and motivation, not just insofar as they themselves are concerned, but because ultimately, through their supervisory, tutorial and teaching functions, their attitude can be transmitted to the research worker and to the student. The difficulty is that attitudes have had time to harden. If they are committed to the library and are, perhaps as a result of library pressure, convinced of its central role in their teaching environment, then all is well. But if, as former students or research workers themselves, or as lecturers at other institutions, their experience of libraries has been unfortunate, then their response may be in very low key, and much work has to be done with them.

Interdisciplines

The concept of relations between library and reader is infinite and I have attempted no more than to isolate a few aspects. However, I would emphasize that the answer to successful relations lies largely with our own initiative, within the usual limits of financial restrictions which prevent us from putting all our ideas into practice. But there is one aspect which is slightly less tangible than most and is beginning to create uncertainty not only for the library but also for its consumers, that is the question of inter-disciplinarity, which has been the major feature of development within the social sciences over recent years and which is beginning to affect our relationships with our readers in a number of ways.

If, as yet, there are no answers to this problem, then perhaps it is still worth mentioning a few of the difficulties. The basic credibility of the relationship between the subject specialist librarian/information officer and the library user is in some cases beginning to creak, not because new subjects are emerging, but because the traditional subjects are taking on new emphases, are spreading themselves and are even enveloping others. We have long learned to live with the problem of area studies, where particular subjects have become subordinated to the overall study of the countries concerned; we have even managed to cope with the spreading out of subjects such as sociology, whose tentacles seem to grasp and remould a different discipline every year. More recently we have been witnessing the spilling over of the social sciences into traditional scientific and technological fields: at Bradford, courses have now sprouted with titles such as European Industrial Studies,[7] Environmental Sciences, Peace Studies, Science and Society and, bewilderingly, Human Purposes and Communications. This sort of development may soon render less relevant the policy of instituting narrow subject specialist schemes in library staff organization—it is already making a nonsense of the traditional idea of departmental libraries, as more and more groups begin to chase the same sort of materials. The confusion is not confined to the library; we frequently find ourselves acting in the role of 'referral centre', putting teaching and research staff in touch with colleagues in other departments who we, but often not they, know are working in the same field.

At Bradford, teaching and research in psychology is being conducted in no fewer than eight separate departments or schools of study. One could wish that such unity of interest could produce unity of demand and usage—in fact it produces little but chaos and conflict for the library, which often has to act as a sort of arbiter without much chance of successfully resolving the conflicting interests of parties who, by any rational standards, should be united.

In the case of the classified arrangement of library stock, for example, the patchwork job that many libraries continue to attempt, in order to reflect changes in the emphasis of certain subjects as studied within their institution, is rapidly becoming impossible. Mechanization and standardization may provide an excuse for opting out of such problems as well as bringing administrative efficiency, but they do nothing to solve the problem of particular groups of users seeing the classification and location of what they regard as their material from an increasingly personal point of view. The problem is not so much disenchantment with the increasingly irrelevant structure of the published classification schemes, as disagreement between a host of groups of users who see the same subject in a quite different light from each other. Social scientists are also beginning to remark on the way in which bibliographical services are failing to keep pace with these new interdisciplines. There are exceptions, but on the whole they have a point.

Conclusion

On reflection, however, in the face of difficulties such as these, perhaps it is even more important that a policy of individual contact and personal relations with our users should be pursued as far as possible, at all levels: with the students because they are our largest group, the researchers because they rely on us and the teaching staff because their attitude affects the attitudes of the first two. If we are successful in this approach, then a library may stand a chance of remaining one of the few university departments where there is still an atmosphere of mutuality and where personality has not yet been submerged by bureaucracy.

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2 Interest profile forms circulated for completion by 150 teaching and research staff in the social sciences at Bradford resulted in a 97 per cent response.

3 BATH UNIVERSITY LIBRARY. Investigation into information requirements of the social sciences. Research report no. 1. Information requirements of researchers in the social sciences. 2 volumes. May 1971.

4 A recent survey of the pattern of student usage of the Social Sciences Library at Bradford (a separate library of around 50,000 volumes located 15 minutes away from the main University campus), showed evidence of 'statistical sabotage' by students whose official representatives feared its closure and integration into the main library of the University.

5 A total of 140 hours of group instruction in the use of the library is recorded in the annual report of the Librarian of the University of Bradford for 1974/5.

6 A survey currently being analysed at Bradford was designed to measure the effectiveness of the subject specialist system in the eyes of the teaching staff; one of the questions represented an attempt to assess how much of the lecturer's time is being saved by the various activities of the subject specialist librarians.

7 A degree course integrating French or German studies with textile technology or manufacturing systems.

YADLOGIS: a success story in co-operation

*Edited by R. J. Duckett**

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Eight libraries in the north-east of England co-operate to produce data which each can use in their own local government current awareness services. This scheme originated in the wish by members to reduce duplication of effort and to enhance local services in the field of local government information. In attempting to reduce delay and increase coverage, but yet to retain local control and responsiveness, a unique system has been established which exhibits a high degree of flexibility and currency—one which could be used as a model for similar services. The planning and operation of this scheme are described, together with the comments of the participants concerning their use of the data. Some overall observations are made of issues and problems in the general area of co-operative current awareness services and of how YADLOGIS (the co-operative scheme discussed) copes with them. In conclusion, some thoughts are voiced on possible inter-regional and national developments.

Introduction

YADLOGIS STANDS FOR Yorkshire and District Local Government Indexing Service. This is a co-operative arrangement between seven public libraries and a county council information unit to produce a database of annotated entries to journal articles. From this database the participants produce a number of current awareness services in the field of local government. Since considerable interest has been shown in this scheme and since an awareness of the problems of providing local government information services seems to be growing,[1] it would seem appropriate that details of YADLOGIS should be made available to a wider public.

Origin and motives

Early in 1975, a number of libraries in the Yorkshire area were providing, independently, a variety of current awareness services to local government based on journals, newspapers, new books, parliamentary and governmental material. Since many of us were duplicating the others' work, the possibilities for co-operation seemed promising, *e.g.*, one library, Kirklees, wanted to establish a current awareness service but wished to avoid unnecessary work. Cleveland, on the other hand, had been forced to cease publication of its own monthly index of articles for financial reasons. Other libraries, such as Bradford, Humberside

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* I wish to acknowledge the help given to me by my YADLOGIS colleagues in compiling this article.

Aslib Proceedings, **29** (4) April 1977, p. 158–167. Printed in Great Britain.

and Sheffield, felt that their own on-going services could be enhanced without much additional staff input, if some form of division of labour could be effected between them. The upshot of these various motives was the convening of a meeting of interested librarians at Bradford in April 1975.

Problems and principles

As the subject of co-operation in this field is still of concern to many, it may be useful to say how this meeting tackled the matter. In a supporting paper, the problem was stated thus:

(a) Probably no library authority is entirely satisfied with its local government information service.
(b) Some libraries are doing their best on limited resources.
(c) There is a need to investigate possible co-operation.

Starting from the premise that all members and officers of local government should have a current awareness service which could be based on their local public library, items that such a service might cover were listed as:

1. Daily and Sunday newspaper articles and news items.
2. Periodical articles relating to local government and to the specialist interests and responsibilities of councillors and departments.
3. All relevant government and parliamentary literature.
4. Relevant items from local papers.
5. Relevant books and pamphlets added to the library's stock.
6. Up-dated topic lists.

Not all present at the meeting agreed that a current awareness bulletin was the best way to serve the needs of local government; some felt that a more personalized intelligence role was preferable. A spirited discussion over the rival points of view followed, but most librarians seemed to opt for the former method as the most economical. But what manner of co-operation? Three possible solutions to the basic requirement were outlined:

1. Individual libraries could subscribe to existing services such as LOGA[2] or Leicestershire's SCAN.[3] But was their coverage adequate? Were they value for money?
2. Individual libraries could produce specialist items for exchange. For example, the Greater London Council exchanges its *Urban Abstracts* for Birmingham City Libraries' Air Pollution, and Waste Disposal Bulletins.[4] Were these too specialized? What could people offer in exchange?
3. An extension of 2 could be a co-operative venture in which member libraries each produce elements of the total service and either:
   (a) exchange them with each other and 'repackage' locally,
   or (b) collect the elements together and distribute from one centre.

The meeting opted for the third method, but left it to two working parties to decide which items to include and which method to adopt.

Later history

Following further discussion, agreement was reached to operate a scheme of the

'3a' variety and to restrict coverage, initially, to periodical articles. A meeting was convened at Kirklees in July to which 'all present [were] to have the authority to agree:

(i) to take part,
(ii) which periodicals they will index,
(iii) the mechanics, so that we might commence production not later than the end of this month'.

The crowded agenda covered such items as which journals were to be included; who indexes which title; indexing criteria; content of entry and layout; format for transmission; control and monitoring.

The crucial point—who would take part—proved a cliff-hanger. Few libraries wanted to commit themselves until the work-load was decided, but this could not be decided until we knew who was joining! However, after a busy morning's work, facilitated by a large number of supporting papers, seven libraries were in and 'blast off' was scheduled in a mere two weeks. Working documents, such as a list of indexing responsibilities, a list of contacts, control list of subject headings, sample layouts and operating details were rapidly assembled in time for the commencement of YADLOGIS in August 1975.

The initial members of YADLOGIS were Bradford, Cleveland, Humberside, Kirklees, Sheffield and Wakefield public libraries and the Information Unit of the South Yorkshire Metropolitan County Council's Department of Administration. It is no mean tribute to these libraries that since 1st August 1975, the system has worked without a hitch. No library has defaulted on its contribution and apart from the occasional hiccup caused by the failure of photocopy machines or postal delays—rarely causing more than a day's delay—the scheme has been trouble-free.

After four months' operation, an assessment of the scheme was made at a general meeting in December 1975. Decisions made at this meeting included:

(1) The wish of the seven participating libraries to continue the venture in substantially the same form.
(2) That despite outside interest, the service was not to be offered for sale.
(3) To restrict the scheme to libraries within Yorkshire, or within easy travelling distance of Yorkshire.

North Yorkshire County Library joined the scheme in August 1976, making the total membership eight.

The operation of YADLOGIS

Half-yearly meetings of the staff involved are held to review the periodicals covered and the operational details. Apart from these and the occasional note from the co-ordinator, the scheme runs itself. More specifically, the details are these. Each library is allocated up to 20 periodicals of mixed frequency and is responsible for scanning the current issues and providing a briefly annotated index entry for any article relevant to the work of local government.

These entries are typed according to a standardized format, together with a suggested subject heading or headings (again taken from a control list), photocopied and sent to all the other participants (keeping one copy for themselves). This is done on a regular fortnightly basis, the indexing period commencing on a Friday (to pick up the heavy weekend intake) and finishing on the following Thursday week. Inputs are despatched by post or the Yorkshire and Humberside libraries' daily van service on the following day and are received on the Saturday or Monday. It is possible for libraries to collate, edit, reproduce and distribute the repackaged data within a week of the end of the indexing period.

Result

At present the scheme covers 156 periodicals, a number which members feel to be about an optimum—there seems no recognizable advantage to be gained in adding to these. An average of 268 articles are indexed every fortnight, although the actual number fluctuates from 170 to 341, depending, in part, upon the number of monthlies and quarterlies indexed. It is, of course, important to realize that this is the input to the system and that no library is likely to use everything indexed.

Local editing is an essential feature of the scheme and each library is entirely free to use the data as it wishes. Some collate and reproduce the majority of the abstracts for general distribution to officers and members, others are more selective and produce sectional or subject lists for more restricted distribution, others again compile data-banks and provide a limited SDI-type service. Similarly, most libraries alter the subject headings to suit local conditions. A corollary to this is that there is no overall YADLOGIS publication, there are only a variety of outputs issued by the participants themselves, and a collection of inputs.

Use made of YADLOGIS

A brief indication of how the co-operatively produced data are used is given below. Current awareness bulletins are only a part of the service given by libraries to local government and the staff contacts named will be pleased to supply further information.

(i) Bradford Metropolitan Libraries

Report by John Denton, Librarian, Social Sciences Library. Bradford use most of the YADLOGIS input in their fortnightly *Local Government Information* bulletin. Some 200 copies are distributed to chief officers and their staff; to the Bradford offices of the Passenger Transport Executive, Water Authority, Fire Service, Consumer Protection and Area Health Authority; to those councillors wishing to receive them and a number are placed in the Members' Room. In addition to journal articles, new books and HMSO material which might be of interest are listed. An average of 176 photocopied articles per issue are currently provided free of charge to members and officers on request.

Bradford's *Local Government Information* was thriving before the advent of YADLOGIS, but there is no doubt that YADLOGIS is a success. Time spent scanning and indexing journals has been cut by two thirds to two hours a week, although editing now takes longer. A two-day loss of currency occurred but this is offset by the increase in the coverage of journals from 60 to 156 The average number of entries per issue has increased from 207 in March and April 1975 to 303 a year later Our users have responded by requesting 4,584 articles in 1975–6, an increase of 120 per cent over the 2,074 supplied in 1974–5

(ii) **Cleveland County Libraries**

Report by Ian Wilson, Local Government Librarian. Just before the inception of YADLOGIS, the need to make financial economies had forced Cleveland to cease publication of its own *Local Government Monthly Information Service* despite its having been well used. The idea of a co-operative scheme therefore appealed as a way to provide a similar service within the limited resources available. (An experiment of circulating photocopied contents pages had proved unsatisfactory.)

Initially, YADLOGIS input was used to compile an information database on cards suitable for retrospective searching, but it soon became apparent that the staff time involved far outweighed the use made of the service. At present, the data are used to produce three abstract bulletins covering education, planning and social services. Approximately 45 copies of each are compiled fortnightly and distributed to the members of the relevant county council, committees, chief officers and departmental libraries. Additional copies are placed in the County members' library and sent to the Research and Intelligence Unit. Production is simple. The fortnightly YADLOGIS input is scanned for relevant entires which are cut out, rearranged in alphabetical order and photocopied. A regular flow of requests for photocopies is generated. Like Bradford, Cleveland find that indexing time is less and journal coverage greater, than with their former service, while currency is no less. Finally, and importantly, it is often quicker to obtain copies of articles from other YADLOGIS members than through more conventional channels.

(iii) **Humberside County Libraries**

Report by Gordon Turner, Reference Librarian. The fortnightly index produced from the material supplied through the co-operative scheme replaces a monthly publication which indexed seventy-three periodicals. The material received from the participating libraries is collated, edited and repackaged using a slightly different list of subject headings. A list of new parliamentary and other relevant publications is added and it is then retyped and reproduced as *Civic Index*.

A distribution list which totals 230 includes the members and officers of Humberside County Council, some members and officers of the district councils within Humberside, the Area Health Authority and various institutions and individuals. The number of requests for photocopies of indexed articles varies considerably from issue to issue but averages out at about 250 requests per issue. The main advantage of the scheme for Humberside is that without any additional staff time being taken up the number of periodicals indexed has been more than doubled and that through the index, readers are made aware of and may obtain photocopies of periodicals not subscribed to by Humberside Libraries.

(iv) **Kirklees Metropolitan Libraries**

Report by Kathryn Sheard, Members' Librarian. The co-operative abstracts are scanned and a selection (about 130 per issue) used to produce a fortnightly bulletin of interest to local government. The abstracts, together with a small number of items extracted from Hansard, are arranged under broad subject headings and apportioned running numbers. After re-typing and duplicating, the bulletin is issued to the seventy-two council members and a small number of senior officers. Requests for 1,230 photocopies have been received in the first year of operation, and now average 60 per issue.

After a year of trouble-free operation, the predicted advantages such as reduction of wasteful duplication of effort and creation of a new service have materialized. Fears regarding the actual mechanics and time schedule have proved groundless. The co-operative scheme has resulted in Kirklees producing an up-to-date bulletin, with maximum coverage for a minimum of staff time and effort.

(v) **North Yorkshire County Library**

Report by Bob Tennant, Divisional Information Organizer. North Yorkshire County Library is the most recent participant to the scheme, although it has been interested in the idea from the scheme's inception in 1975. The data are used selectively, notifying only the most significant articles to existing contacts in departments of the County Council. These contacts normally have a research role as at least part of their duties. Periodicals known to be scanned regularly in a department are ignored and only 'fringe' material, i.e. journal articles unlikely to be seen within that department, are notified. This informal approach obviates the need for the generation of further paper in the form of bulky information bulletins; the use of the data also expands the existing good links with departmental users established by the county library.

(vi) **Sheffield Metropolitan Libraries**

Report by Douglas Hindmarch, Arts and Humanities Division. Participation in YADLOGIS has allowed the city libraries to expand their service to other departments, particularly those with no full-time professional library staff, within the limits of their existing resources. The basic data, supplemented by details of new books, newspaper cuttings etc. are used to produce two specialist bulletins, *Housing Information* and *Education Information*; 42 and 49 copies respectively are currently distributed within the authority and copies are also sent to Birmingham in exchange for their *Waste Disposal and Recycling Bulletin* and *Air Pollution and Noise Bulletin*. Response to the bulletins is now running at the rate of about thirty items per issue in each case.

(vii) **South Yorkshire County Council**
Report by Dianne Garrard, Information Officer, Department of Administration. Since November 1975 YADLOGIS input has been used to prepare a fortnightly bulletin *Current Articles*. Just over half of the entries are selected, then rearranged under broad subject headings, numbered consecutively and copied by offset litho. Fifty copies are produced and distributed to all departments of the authority. Each issue contains about 150 entries and 56 requests are received for individual articles. *Current Articles* is also used to develop a subject index to journal articles. Each entry is pasted onto a card and detailed subject terms assigned from a thesaurus of local government terms. The index comprises over 4,000 entries and scores over published abstracting services through its currency, ease of use and locally generated subject terms. Without the co-operative effort of YADLOGIS it would be impossible for the Information Unit to provide an abstracting service covering such a wide range of journals and with such good currency.

(viii) **Wakefield Metropolitan Libraries**
Report by Richard Withey, Reference Library. The exact nature of the service to be offered by Wakefield Libraries has still to be determined. A report by the library is still under discussion. Despite this delay in implementing a local service, Wakefield continues to supply index entries and photocopies of articles to other YADLOGIS members.

Issues and problems

(a) *Centralized* vs *decentralized*

Unlike similar co-operative ventures in this field such as the West Midlands venture based on Birmingham City Libraries, the South Western Regional Library System project based on the Bristol headquarters and the Leicestershire based *Social Work Information* Bulletin (Leicestershire County Library, Leicester University, Cheshire, Coventry and Derbyshire), YADLOGIS is not a centralized system in which one unit collects, edits and processes the input produced by participants. Instead, each participant edits the total input separately—a fact reflected in the wide variety of use to which the collectively produced material is put. This structure was adopted principally because no library felt able to take on the production work involved in a centralized scheme. This may, however, be fortuitous since by dealing with each other direct, the need to make use of a 'middle-man' is removed and extra currency gained. Having said this however, some duplication does exist as some libraries prefer to re-type onto stencils and duplicate rather than photocopy direct from the typed inputs. An experiment is now under way with Rotherham Borough Libraries to overcome this duplication by producing output which is flexible enough (i.e. subject lists) to be used selectively and yet good enough to be used as it stands without further editing or typing. YADLOGIS members are divided over whether Rotheram's output could replace the existing exchange arrangements or whether it would just supplement local output.

(b) *Local* vs *national information*

At the planning stage, some libraries were worried that a co-operative scheme would miss the highly important items of local news. Such a fear has, I think, been unrealized. News relating to one local authority *is* indexed by the others and items of particular interest to an authority (such as ports to Humberside and Cleveland, immigration to Bradford and Kirklees) are noted by other libraries (who although indexing these items, may not use them in their own current awareness services!). A related problem is that YADLOGIS members include county councils, district councils and metropolitan counties and each has to be conscious of the differing responsibilities of the others; for example, education is not a metropolitan county responsibility whilst transport is.

(c) *Staff-time*

Probably the greatest fear of members and potential members, even now, is over the commitment of staff time to indexing. In fact the average time spent by staff providing the input is small since only a minority of the journals to be scanned are likely to be weeklies. Time spent in producing a current awareness service is a different matter and depends more on a library's priorities than on the YADLOGIS system. Inputs which can be photocopied for re-use with ready-made subject headings do reduce editing and production time. It seems surprising to us that there are still libraries indexing periodicals themselves who could greatly enhance their own services for no greater, and possibly less, effort by co-operating with other libraries.

(d) *Supply of articles*

All the current awareness services run by YADLOGIS members offer the back-up facility of supplying copies of the indexed articles to those receiving the services. Normally, the libraries will try to supply copies from their own holdings but as no member subscribes to the complete range of titles covered, this is not possible. Membership of YADLOGIS provides an easy solution to this problem by providing a union list of members' holdings of the titles covered. In practice, it has been found quicker and cheaper to obtain copies from other YADLOGIS members (usually the library who indexed the article required) than to rely on conventional inter-library loan procedures. The overall figures for such mutual help is not known although Bradford requested 241 articles in 1976 and supplied 349, the County Council being the major beneficiary.

(e) *Non-periodical material*

YADLOGIS members feel that little would be gained by increasing the number of journals already indexed—apart from additions and deletions carried out as part of normal revisions. New members to the service would enable new types of material to be included, and the future inclusion of material relating to debates and questions in Parliament is a real possibility.

(f) *Monitoring*

Is too much being indexed or too little? Are significant items missed, or insignificant ones included? Is the imbalance between the quantity of input-produced by the various units due to different indexing criteria, bias, or is it a reflection of the quality of journals indexed? Is the service as up-to-date as it could be? Which journals are the most productive and which are least so? Is the distribution of journals between units fair, bearing in mind frequency, length, quantity and quality of articles? How is the service received? These are all questions we should be asking ourselves but, busy librarians as we all are, they do not get the consideration they should. Subjectively speaking, the service appears to work well. All members are keen to continue. Some members of staff at the School of Librarianship, Leeds Polytechnic, take a friendly interest in YADLOGIS and seven under-graduate librarianship students are currently comparing their choice of items to index with ours.

(g) *Wider issues*

How does YADLOGIS compare with other services? Could members get a better service elsewhere? Is it cost-effective? How could YADLOGIS be usefully modified or extended? Could YADLOGIS usefully co-operate with other similar ventures and so reduce yet further wasteful duplication of effort? These are big questions. At an evaluation meeting held in December 1975, where a decision was to be made on the future of YADLOGIS, an attempt was made to compare YADLOGIS with alternative services available on subscription.[5]

The three conclusions reached were that:

(i) In terms of the number of journals covered and of promptness, YADLOGIS was at least equal to the nearest comparable service, Leicestershire's *Scan Review*.
(ii) In terms of length of abstracts and of the coverage of non-journal material, most alternatives were better.
(iii) In terms of the estimated number of entries per year (8,840), YADLOGIS was by far the most productive.

Close comparison has not been possible, and most alternative current awareness services are better within their own speciality. But overall and bearing in mind the added flexibility of YADLOGIS, members considered that it was well worth the effort and that they could not do better than continue.

On the subject of YADLOGIS co-operating with other services, possibilities do exist. Perhaps what we really need is a national database of periodical articles —a sort of *British Humanities Index*-cum-*British Education Index*-cum-*DoE Library Bulletin* etc. issued in weekly parts as a British National Bibliography of Periodical Articles, or issued in some alternative form which could be tailored to subscribers' requirements. Such is the dream but existing services could be improved. If the three titles just mentioned had the currency that YADLOGIS attains then there would be less need for such local ventures. And on the theme of co-operation we think we have a viable scheme and we believe our own local services have gained from co-operation. We also think our model could be used for other tasks. The most fruitful line of advance may be along that of Birmingham's exchange arrangements with, for example, the GLC and Sheffield (the latter using YADLOGIS data). Perhaps YADLOGIS should concentrate on subject areas or materials not already covered. The main problem would be that we would expect others to attain our high degree of currency!

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2 LOGA. Local Government Annotations. A monthly service issued on behalf the Advisory Body of Librarians (London Boroughs Association) by the London Borough of Havering.

3 Leicestershire Libraries and Information Services operate a variety of current awareness bulletins such as *Scan* (a daily service based on newspapers), *Scan in Parliament, Scan Review* (journals) and *Local Scan.*

4 See for example, STOKES, P. *and* GRAYSON, L. An experiment in the exchange of secondary information sources in local government. *Library Association Record,* 77 (11), November 1975, p. 261–62.

5 The alternatives considered were: DoE *Library Bulletin*; HERTIS *Information Review, Further and High Education*; *LOGA*; *SCAN Review*; Wiltshire County Library's *Social Services Abstracts*; and GLC's *Urban Abstracts.*

The UDC in North American compulsory library education

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THE GATHERED EVIDENCE concerning the place of the UDC scheme in American library schools is insufficient or lacking for the earlier periods of curricular history, but 30 years ago one investigator[1] suggested that UDC was a significant ingredient of the typical cataloguing and classification course although not necessarily taught by every school. It is possible today to examine the position of the scheme over the past 20 years because of the detailed findings of three surveys and it will be shown that UDC has held a place in the theoretical teaching of half the schools but that very few courses have provided for practice work on the schedules.

The Young investigation,[2] issued 20 years ago, found that the *Dewey Decimal Classification* dominated course content in respect of library classification, with every student becoming familiar with some version or edition of this scheme and with every responding accredited school using Dewey as the basic scheme in the required cataloguing course. Next most widely used was the *Library of Congress Classification*, reported taught by three-quarters of the schools. Nearly half the responding schools included discussion of Congress, though with two exceptions such discussion was of only an introductory or limited character, while a third of the schools ensured some practical familiarity with this scheme and two schools regarded it as the basic scheme for one semester of their two-semester courses. Just over half the responding schools at this time included *Cutter's Expansive Classification*, but—with one exception—this system was accorded but a brief and entirely theoretical consideration and this treatment doubtless reflected the situation in the American library field where the scheme was fast losing popularity.

Other bibliographical and library classifications were included in compulsory courses and received limited discussion as follows: the UDC by 13 of the 29 responding schools, the *Bliss Bibliographic Classification* by 12, *Colon Classification* by 11, and *Brown's Subject Classification* by 6, but only a few students became familiar with these other schemes since each was cited only once for limited practice work and only once (in the case of UDC twice) for any detailed discussion.

Thus 20 years ago the position of the UDC scheme was that it was treated in at least 15 (and possibly in 16) of the 29 responding schools and of these schools 13 granted it a brief theoretical consideration, 2 gave it a more detailed discussion and one school arranged for limited practice work on the scheme. No school chose UDC as the basic scheme for the required curriculum. Of the 7

Aslib Proceedings, 29 (4) April 1977, p. 168–171. Printed in Great Britain.

classification systems mentioned, the UDC held fourth place regarding extent of distribution in American library schools, being closely behind Cutter but just ahead of Bliss. Taking the figure of 15 schools, UDC was taught in 52 per cent of the responding ALA accredited schools.

A later investigation,[3] undertaken in 1961, confirmed that Dewey was the most widespread and stressed scheme in the basic cataloguing and classification courses, being taught by all 32 accredited schools and with practice exercises demanded. Almost half the schools taught the Congress system, including practical exercises. UDC was taught in 9 of the 32 schools. Other systems included in the basic curriculum were Colon (taught in 9 schools), Bliss (7), Brown (4), and Cutter (2), but none of these schemes was used in any compulsory practical work. The UDC classification, however, was involved in practice exercises at 3 schools and was the only foreign system in the curricular repertoire to be applied in this way. It can therefore be regarded as having claim to the third position in the lists and was taught on a compulsory basis in 28 per cent of the schools.

The most recent investigation[4] of the North American compulsory cataloguing and classification courses reveals that Dewey continues to be the most taught and most stressed scheme in accredited schools, receiving emphasis in most and covered by each of the 46 responding schools, followed closely in distribution by the Library of Congress scheme. Most responding schools teach not only the theory of these two systems but have their students examine the schedules. Most schools also arrange for practice work on Dewey and over half provide this for the Congress system.

After Dewey and Congress, the next most widely taught scheme is UDC, covered by 26 (or 57 per cent) of the 46 responding schools in their theoretical instruction. Five of the 26 schools concerned report that they are providing only a brief consideration of the system, commenting that the classification is 'introduced in lectures', 'mentioned only', 'noted briefly', 'defined only', or that 'mention is made of it'. Twenty-two schools refer to a full edition, 7 schools to an abridgement, with 3 schools apparently covering both levels.

Eight of the 26 schools concerned have their students examine the actual schedules of the abridgement and one of the 8 schools apparently also exhibits the full version but this particular school confines its examination of both levels to limited audio-visual demonstrations in class. An additional school indicates that its students may examine UDC schedules of both versions at their option, but this occurrence has been disregarded in the results of the survey which was concerned with only compulsory demands.

As for practical work on UDC, 2 schools include this and both use the abridgement. One of these schools is an American school under some British influences, the other is located in Canada. A further school notes that its students may undertake practical exercises at their option, but the version employed is not clear—presumably the abridgement since this is specified for the examination of the schedules.

No school makes UDC its sole emphasized classification scheme in the theoretical instruction, although two schools do include it among their preferred systems. One of these schools stresses Dewey, Congress and UDC equally.

At the second school, some teachers stress Dewey and UDC equally, but other instructors there select Dewey and Congress and the same varied pattern applies to emphasis in the practical aspects of the curriculum. Apart from this latter school—which was under some British influences—no library school prefers UDC in its practical work, whether as sole or as shared choice.

The UDC classification, in respect of extent of distribution in the compulsory courses, continues to hold third place as it had done at the time of the Mannlein survey. In a field of six schemes, the UDC is slightly ahead of Colon, although the latter is sole choice at one school for theoretical emphasis whereas UDC is not singled out in this way by any school. The relative rankings regarding distribution are Dewey (taught in all 46 responding schools), Library of Congress (42 schools), UDC (26 schools, or 57 per cent), Colon (24), Bliss (14), and *Rider* (6 schools).

Thus the story of UDC in North American library schools may be summarized thus:

Date of research	1956	1961	1973/4
Relative place in distribution of schemes	4th	3rd	3rd
Number of responding accredited schools in which taught	15/29	9/32	26/46
Percentage of responding accredited schools in which taught	52	28	57

The scheme has kept an important place in the theoretical aspects of the obligatory curriculum and is taught in just over half the courses. It possesses many features which must surely make it attractive to teachers trying to inculcate sensitivity to the classificatory needs of different kinds and sizes of libraries, catalogues, and bibliographies. For example, it exists in brief, medium and extended versions, allows great flexibility in combination patterns and—alone of the general classifications—may be applied in single- or multiple-entry modes. It can also be used in either precoordinate or post-coordinate systems.

The UDC has always been taught by rather more schools than the Bliss scheme and indeed, at present, UDC is taught by twice as many schools. However, it seems likely that the new and major revision of the Bibliographic Classification will come to rival or overtake UDC in course ratings. The new Bliss will present teachers with an up-to-date, realistically detailed example of the analytico-synthetic and faceted models, complete with supporting rationale and guide. It is important that UDC be radically revised to incorporate changes in knowledge and language, to reflect current advances in the theory of classification, notation, and indexing and to provide an extended introduction and directions for use. A modern and improved one-volume condensation could result in much heavier use of the scheme for practice exercises.

The 'curricular appeal' of UDC is one key to the scheme's ultimate worldly success, to its wide adoption in the library and bibliographic fields. North America has perhaps the largest number of library schools and students (including many overseas students) in the world and so the compulsory instruction there will influence future professional decisions of numerous librarians and instructors not only across USA and Canada but in many other locations.

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Members prices in brackets

3 Belgrave Square, London SW1X 8PL

Aslib Publications

"PALMER'S INDEX TO
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Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed at the Alden Press, Oxford

ISSN 0001 253X

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Aslib Proceedings

VOLUME 29 MAY 1977 NUMBER 5

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Key Books in business and management studies: a bibliometric analysis

Gerry M Smith

The City University*

Introduction

TRADITIONALLY, the specialist subject expertise required of librarians and information workers has been of two types:

(i) familiarity with the conceptual content of the subject literature
(ii) knowledge of the documentation system controlling that literature.

In recent years, our appreciation of subject literatures has been extended by the development of studies describing the socio-historical factors affecting the production of literatures and by an expanding range of 'information scientific' studies, analysing the formal properties of literatures. Socio-historical studies analyse such variables as sex, age, rank, professional age and institutional affiliation of contributors to subject literatures and place such contributions within the context of the pattern of research grants, ranking of institutions, doctorates awarded and activities of professional associations.[1] 'Information scientific' studies have been conducted which investigate, for example, patterns of demand on particular libraries,[2,3] the citations to different journals,[4] and, probably most important, analyses of citations by form of publication, subject content, language and age. Such studies were initially concerned with the literature of science and technology,[5] but more recent work studies the social sciences[6] and some humanities subjects.[7]

The value of some studies is purely theoretical—they contribute to the background knowledge base of librarianship and information science. Others have practical applications, ranging from large-scale studies providing planning data on the design of information systems and services[8] to the smaller-scale identification of, say, key journals in a particular subject field.[9] The studies completed thus far can still fairly be termed pioneering work: many subject areas are still to be analysed and there is scope for experimental testing of different methodologies.

This paper attempts to:

(a) combine some of the features of the socio-historical and the information scientific approaches to bibliometrics
(b) apply them to a multi-disciplinary social science field in the early stages of growth which has hitherto been neglected and

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* Acknowledgement: the author wishes to thank Albert Russell and Ian Dobbs, Senior Lecturer and sometime M.Sc. student respectively, The City University Graduate Business Centre, for invaluable advice, and help at the computing stage of this project.

Aslib Proceedings, 29 (5), May 1977, p. 174–188. Printed in Great Britain

(c) produce results which are practically useful as well as theoretically interesting.

Background

The present study was undertaken to find solutions to two problems resulting from a generous grant for collection development by a non-UGC foundation to The City University Graduate Business Centre Library in 1974. These problems were:

(i) having already established a good basic collection of business and management books,[10] what criteria should we adopt to increase the efficiency of our selection of further material for teaching and research purposes? (Being in a field in which it is conventional wisdom that much of the material published is 'worthless', made this a more pressing problem than it would have been were we operating in a more mature subject field);

(ii) as the books we were to purchase would fill the library to capacity long before it would be possible to provide suitable additional accommodation, what criteria were we to adopt for retiring less-used material to reserve store?

I considered that decisions relating to both problems would be made more rationally if we had a detailed profile of the monograph literature of 'management'. It seemed sensible to establish what, if any, were the discernible characteristics of heavily used books in the field.

Methodology

We needed several listings of the heavily used monographs from business school libraries and initially contacted seven UK business school libraries asking them to supply listings of books in their heavily used 'short loan' or 'reserve' collections. One library did not have such a collection, a second was unable to produce a list and a third produced a list which explicitly excluded several sub-disciplines and was, therefore, unsuitable because it would have introduced a bias into the population. Left with four usable lists, I contemplated adding data from a major published work in the field, the British Institute of Management's *A basic library of management*. This was rejected as it was felt to be different from the other four; it contained a preponderance of practical books and more of BIM's own publications than the other lists; perhaps more important, the number of items on it outnumbered those on the other lists combined and its inclusion would have distorted the results. The four lists analysed contained a total of 670 books, of which 109 appeared on more than one list. The great majority of these repeated items only appeared on two lists. (It is interesting to reflect that four institutions with very similar objectives and outputs make use of such different resources: the author expected a much greater overlap of material). As it was felt that inclusion of any book title more than once would distort the profile, we decided to count each item only once, however many of the four libraries listed it. The population being analysed was, therefore, 561 items—large enough, it was felt, to be representative of all books heavily used in UK business school libraries, though clearly not representative of the totality of books in the field. The data was obtained by actually examining books on the lists. This presented no problems in the vast majority of cases, in which all information was contained in the preliminaries and/or dust jackets. In a few cases the available data had to be enriched by reference to major bibliographies.

In an even smaller number of cases where copies of the items could not be examined, information which could reasonably be inferred from existing knowledge (*e.g.* occupation of an author already represented on the list by another title), the required data was provided by informed guesswork. Even if some of the guesses were wrong, the cases in which it was used were a tiny proportion of the total, and would not, therefore, distort the analysis.

It was decided to analyse each book by the following characteristics: authorship (academic, practitioner or institution); type of book (*e.g.* textbook, cases, readings); subject; nationality; publisher; language and date of publication. In view of the advantages to be gained in handling such a large volume of data, it was decided to analyse the data using the Statistical Package for the Social Sciences,[11] a computer program ideal for this type of analysis because of its capacity for cross-tabulation: manual cross-tabulation would have been virtually impossible. The value of cross-tabulation, as will be seen from the results below, is that it permits a more sophisticated analysis and highlights patterns and relationships which are largely obscured by aggregations of data.

Results

Authorship

In subject fields such as history or French literature there would be little point in analysing authorship by occupation—virtually all authors would be academics. However, in a vocational field such as business studies, I felt it would be useful to ascertain what kind of people wrote the important books. Accordingly, the authorship of each book was allocated to one of the following categories: academic, practitioner or institution. 'Academics' were those authors whose major occupation at the time of writing the book was in an institution which was responsible for teaching; 'practitioners' included occupations such as accountants, systems analysts, marketing managers and journalists; 'institutions' was the category allocated if the book was not assigned a personal authorship, but presented as a report by an institution (the category included organizations such as the Brookings Institution, but the majority of the items in this category were UK government publications). The results of the analysis of authorship, (Table I [a]) were surprising—a higher proportion of books written by practitioners had been expected. Taken in isolation, the fact that only 17.8 per cent of the books had been written by practitioners would give ammunition to the many critics of British management education who complain that it is too academic and divorced from the 'real world'. However, the more sophisticated cross-tabulations present a more encouraging picture. The cross-tabulation of authorship with date of publication (Table I [b]) shows a marked trend towards books written by both practitioners and institutions, in spite of the massive

	[a]	[b] Date cross-tabulation			[c] Some subject cross-tabulations				[d] Nationality cross-tabulation		
	Total	*1960–4*	*1965–9*	*1970–4*	*Sociology*	*Economics*	*Organisation theory*	OR	*UK*	*USA*	*Other*
	%	%	%	%	%	%	%	%	%	%	%
Academics	435 (77.5)	87.1	77	72	39 (95.1)	37 (90.2)	34 (94.3)	22 (64.6)	180 (65.7)	240 (89.9)	15 (71.4)
Practitioners	100 (17.8)	8.7	18.5	20.6	2 (4.9)	2 (4.9)	1 (2.8)	12 (35.4)	74 (27)	24 (9)	2 (9.5)
Institutions	26 (4.6)	4.2	4.5	7.4		2 (4.9)	1 (2.8)		20 (7.2)	2 (0.7)	4 (19)

TABLE 1: *Authorship*

growth of employment of academics in these fields in the period covered by the table. The growth in the proportion of material written by institutions might be a result of two factors—the increasing interventionism of UK government in the business field and/or the fact that government publications are relatively ephemeral and are weeded from heavily used library collections fairly quickly, thus leaving a disproportionately recent number of items in the collections. The author/subject cross-tabulation reveals that most of the 27 subject subdivisions have an authorship profile similar to the overall profile. Those significantly different are given in Table I [c]. It is not really surprising that the key books in sociology, organization theory or economics—all 'academic' subjects—should be written predominantly by academics. The relatively high proportion of practitioners writing popular O. R. books is indicative of the strong practical orientation of that subject.

The differences in authorship between most types of book follows the aggregate pattern, except for the two striking deviations: academics compiled 98.1 per cent of the books of readings and 90.9 per cent of the books of cases, (the lack of cases compiled by practitioners is slightly disturbing as case study writing is an activity, it could be argued, in which practitioners are better placed than academics to write useful material); the other analysis which might comfort those who consider the proportion of books by practitioners to be too low is the cross-tabulation of authorship by nationality. Table I [d] shows clearly that the preponderance of books by academics is accounted for by the high proportion of books by US academics. In fact, over a quarter of the UK titles were written by practitioners. (One would, of course, expect a different distribution from a similar study based on holdings of US libraries.)

Subject

The subject distribution of the material studied is given in Table 2. The divisions used are based on the main sub-divisions of the *London Classification of Business Studies*,[12] the pre-eminent classification scheme in the field. Difficulties were

	%		%
Finance	48 (8.5)	The enterprise	18 (3.2)
Marketing	46 (8.2)	Portfolio investment	16 (2.8)
Economics	41 (7.3)	Corporate strategy	15 (2.7)
Sociology	41 (7.3)	Behavioural science	13 (2.3)
Organization theory	36 (6.4)	Mathematics	11 (2.0)
Operational research	34 (6.0)	Marketing Research	10 (1.8)
Management	34 (6.0)	Psychology	8 (1.4)
Automation	28 (5.0)	Communication	7 (1.2)
Industrial Relations	25 (4.5)	O & M/Work Study	7 (1.2)
Law	23 (4.1)	Microeconomics	6 (1.1)
Statistics	23 (4.1)	Industries	3 (0.5)
Accounting	22 (3.9)	Philosophy, Scientific methods	2 (0.4)
Personnel	22 (3.9)	Transport	1 (0.2)
Production	21 (3.7)		

TABLE 2: *Subject distribution*

encountered in assigning classifications to books on more than one subject (i.e. on topics such as statistical techniques in market research and the law of industrial relations.) Such items were allocated to the subject classification which would have been used as the shelf location number which most customers would find most helpful: only one classification was, therefore, given for each item. The most striking point about the subject breakdown is the wide spread of sub-disciplines that is hidden by the generic concept of 'business and management studies'. The smallness of the 'management' proportion amplifies the point. In view of the fact that business schools have been developed primarily to improve UK industrial performance, it is disturbing to reflect on the tiny percentage (0.5 per cent) of industry studies, even though there are fairly large numbers of such studies now available in book form. One possible explanation may be that business school curricula do study specific industries but as large-scale group projects which are supported by specially-prepared 'information packages' of newspaper and journal articles, photocopies from statistical tables and financial information services, etc.

	Total %	*UK* %	*USA* %
Marketing	46 (8.2)	16 (5.8)	30 (11.3)
Economics	41 (7.3)	24 (8.7)	14 (5.3)
Sociology	41 (7.3)	25 (9.1)	16 (6.0)
Organization theory	36 (6.4)	11 (4.0)	25 (9.4)
Management	34 (6.0)	12 (4.4)	19 (7.1)
Industrial relations	25 (4.5)	21 (7.7)	4 (1.5)
Law	23 (4.1)	21 (7.6)	1 (0.6)

TABLE 3: *Some subject/nationality cross-tabulations*

Cross-tabulations of subject by author and by date produced results which were unusable because of the level of disaggregation. The analysis of subject by type showed a distribution of books in most subjects similar to the distribution of the total. One interesting difference was that, although marketing books represent 8.2 per cent of the total population, marketing readings represent 20.8 per cent of all readings.

The remaining subject cross-tabulation, that of nationality, is, perhaps, the most practically useful one: it quantifies the degree to which different business/management disciplines are culture-specific. The implication I draw from Table 3 is that there is little point in UK business school librarians selecting US books in law or industrial relations, but that American books on the other subjects in the table are readily acceptable in UK business schools. The UK and USA proportion of books in subject categories not included in the table are broadly similar to their proportions in the total population.

Type

Business studies, in common with most other social science fields, makes use of a wide range of documentary information. A bibliometric study of the use of *all* information sources would probably reveal fairly heavy reliance on newspapers, working papers, government publications, statistical material, company reports, company and market research information services, in addition to books and journals. Such a study is, however, outside the scope of this paper, which is concerned only with books. However, because there appear to be several different types of book used in the subject, I considered it useful to analyse the popularity of the different types. The books fell into seven categories: textbooks, monographs, readings, essays, case studies, reports, and programmed texts. It became evident early in the study that, however desirable, it would be impossible to draw a meaningful distinction between 'monographs' and 'textbooks'. Defining a textbook as one covering a broad subject, addressed to a student audience, often at an introductory level and presenting a synthesis of current thinking in its field, it is obvious that an item like Samuelson's *Economics* should be placed in this category. Equally, having decided that 'monographs' should include all books covering narrower fields, at a higher level than a textbook, addressed to academics and practitioners as well as students and presenting original work, often the results of advanced research, there is no problem placing Meadows' *The limits to growth* in this category. Between these extremes, however, there are large numbers which could be allocated to either category: these ideal types are at the opposite ends of the same continuum. Faced with this difficulty, the categories had to be merged.

Books were ascribed to the 'essay' class if they were collections of specially commissioned papers—as for a conference or simply for the publication of the book. They are to be distinguished from 'readings', which are repackaged collections of previously published papers. 'Cases' are both books entirely of case studies or, more commonly, books of text and cases such as R. N. Anthony's *Management accounting: text and cases*. 'Reports' are studies by institutions, such as Research Papers of the Royal Commission on Trade Unions and Employers' Associations and the study by the Boston Consulting Group, *The impact of strategic planning*. (The great majority of reports were, in fact, HMSO publications). The results of the analysis of book types given in Table 4 [a] surprised the author. In particular, the predominance of monographs/textbooks and the low percentage of reports, cases and programmed texts were unexpected. That only two programmed texts featured in the population challenged my assumption that programmed texts were a fairly important section of the literature in management/business studies. That only 3.6 per cent of the total were reports was surprising in view of the growing importance of central government in the regulation of industry and commerce. The most surprising result, however, was the unexpectedly small proportion of cases. The case study method is a learning technique with a special place in the teaching of business and management studies, based largely on the development of the method at Harvard Business School. It reflects a creditable desire on the part of the management educators to remain firmly rooted in 'real world' by simulating business problems and confronting students with decision-making situations. I was under the impression before conducting the survey that cases were a major component of the subject literature. Vernon[13] describes books of cases as 'one of the hallmarks of management literature'. I would have guessed that they accounted for

	[*a*]	[*b*] *Author cross-tabulation*			[*c*] *Some subject cross-tabulations*					[*d*] *Nationality cross-tabulations*	
	Total %	*Academic* %	*Practitioner* %	*Institution* %	*Marketing* %	*Finance* %	*Sociology* %	*Law* %	OR %	*UK* %	*USA* %
Monographs/ textbooks	430 (76.6)	334 (76.8)	86 (86)	9 (34.6)	28 (69.9)	41 (85.4)	34 (82.9)	21 (91.3)	31 (93.9)	210 (76.6)	203 (76.0)
Readings	53 (9.4)	52 (12.0)	0	1 (3.8)	11 (23.9)					19 (6.9)	34 (12.7)
Essays	34 (6.0)	22 (5.0)	12 (12)	0						25 (9.0)	8 (3.0)
Cases	22 (3.9)	20 (4.6)	1 (1)	1 (3.8)						3 (1.1)	19 (7.1)
Reports	20 (3.6)	4 (0.9)	1 (1)	15 (57.7)						16 (5.8)	1 (0.4)
Programmed texts	2 (0.4)	2 (0.4)	0	0						1 (0.4)	1 (0.4)

TABLE 4: *Type of book*

10–15 per cent of the heavily used books rather than the 3.9 per cent revealed in the study. There are two possible reasons for the low number of case studies. Firstly, that those cases which are used for teaching purposes do not enter libraries, because teachers obtain copies of the case for each student from the specialist clearing houses set up at Harvard and Cranfield,[14] secondly (and probably less likely), that the libraries chosen for the survey serve institutions which are less case-oriented than others.

The most interesting result to emerge from the cross-tabulation of type of book by author (Table 4 [b]) is the virtual absence of cases written by practitioners—another weapon in the armoury of critics of the 'academicism' of management education. The relative importance of institutions as authors of reports was inevitable, given the criteria used for institutions and reports. Column [d] in Table 4, reveals those subjects in which a significantly higher proportions of the books than the average are comprised of textbooks and monographs—operational research, with 93.9 per cent of its total comprising textbooks/monographs being the most notable example. It is difficult to see why there should be a relatively high percentage (23.9) of readings in the marketing collection. Column 4 [d] reveals some interesting cross-tabulations: the relatively high proportion of USA readings is probably accounted for by the professional age of the business studies sub-disciplines in that country—enough time has elapsed for key papers to be written which are worth collecting together and repackaging as books of readings. The preponderance of UK reports points to the fact that official documents in this field tend to be culture-specific; a similar survey conducted in the USA would be expected to produce opposite results. Cases in this cross-tabulation again merit discussion. The numbers of British cases revealed in this analysis are little short of alarming: only 3 British case books represented in a total of 670 books in heavy demand in 4 British business school libraries! It appears on this evidence that there is a wide market gap for UK publishers and authors of case study collections.

Publisher

If the results of a study such as this are to be useful in book selection, it is arguable that one of the most useful results is information on the leading publishers in the field to enable librarians to ensure that they are well represented in their collections. Table 5 gives a listing of the top 33 publishers identified in the survey. These were the leaders in a staggeringly long list of 151 publishers (although a very large proportion of the publishers are represented by only one title). The top 11 publishers account for 50 per cent of the books in the survey, the top 30 for 70 per cent. The leading positions held by McGraw-Hill, Prentice-Hall, Wiley and Irwin were as expected, but I was surprised to find Penguin, Allen and Unwin, HMSO and CUP so high in the ranking, not having formerly regarded them as 'management' publishers. Unexpectedly low in the table are Gower Press, Harper and Row and Harcourt Brace, Jovanovich. Surprising omissions from the top 30 are the British Institute of Management and Pan (only one item published as a BIM book appeared in the survey.) Further analysis of the data of interest to publishers is being prepared for dissemination by a more appropriate medium.

1.	McGraw-Hill
2.	Prentice Hall
3.	Penguin
	Wiley
5.	Irwin
6.	Allen/Unwin
7.	Heinemann
	HMSO
	Macmillan
10.	Holt, Rinehart
11.	CUP
	Longman
	Hutchinson
14.	Free Press
15.	Pitman
	Gower
	Tavistock
18.	Butterworth
	Harper & Row
	RKP
21.	Harvard U.P.
	Staples Press
23.	Collier Macmillan
	Macdonald
	Evans
	Cassell
	Harcourt, Brace
28.	Business Books
	Allyn & Bacon
	IEA
	IPM
	MIT Press
	Wadsworth

TABLE 5: *Top publishers*

Language

Research at Sheffield University revealed that very few academic social scientists made use of material published in languages other than English.[15] In order to assess the extent to which business studies teachers/students follow this pattern, a check was made of the language of the material in the survey. Only two items (0.4 per cent) were in non-English languages. At least one of these items, included in the list of my own short-loan collection, was the result of a clerical error! The conclusion to be drawn is that whilst public opinion expects British companies to become more active in export markets, in British business schools only English language material is used. This could, of course, be a reflection of the fact that English is the major international business language, or the lack of suitable foreign-language material.

Nationality

Analysis of the literature by nationality was considered essential in view of the consensus of British opinion on American literature, expressed thus by the Librarian of London Business School: '. . . there is a great disparity in standard and value between the best and worst American management books and articles. An unfortunately large number of them must inevitably be rejected by British and American managers but the best are essential for study and reading. In addition, many American writers, even the best, are wordy and unattractive in style to British readers, so a natural resistance is sometimes built up against them, perhaps unfairly, for this reason alone.'[16]

In the early stages of the project it was assumed that the best criterion for establishing whether a book was 'UK' or 'USA' would be by referring to the publisher's address. It soon became apparent, however, that this criterion was unsuitable because of the multinational character of many of the leading publishers: McGraw-Hill International is based at Maidenhead; Penguin has a

Baltimore address! It was decided, therefore, that a more appropriate criterion for nationality was the country of the author's employment at the time the book was written; judged by this criterion, it seemed likely that a book written by an academic at, say, Stanford Research Institute, would be 'American' in style and orientation and based on American experience. A book such as Ray Wild and Bryon Lowes' *The principles of modern management*, though published by what most libraries would probably regard as an 'American' publisher (Holt, Rinehart and Winston), is clearly a 'British' book, written by UK contributors, about the UK environment and addressed to UK undergraduates. On this basis, it was found that there is a fairly even split between UK and USA material and that books from outside these countries (*e.g.* from Australia and Canada) constitute only a tiny proportion of the total (Table 6 [a]). Cross-tabulation of nationality against author/type (to answer questions such as what proportion of the books written by practitioners are British?) reveals some very interesting results: encouragingly, as seen from Table 6 [b], 74 per cent of the material written by practitioners was British; the proportion of US books by academics was, as might be expected, significantly higher than the proportion of US books in the total. The analysis of nationality by type (Table 6 [c]) reveals some significant differences. Reading collections are predominantly US (63 per cent), cases even more so (86.4 per cent), whilst essay collections (73.5 per cent) and reports (80 per cent) are predominantly UK.

Perhaps the most significant finding of the whole survey was the cross-tabulation of nationality with date of publication, shown as Table 6 [d], which reveals a very strong trend away from American and towards British material. This table quantifies what most observers would expect to be the case, that as the British study of business and management matures, local material is developed, and that, if the trend continues, American material will eventually constitute only a minor claim on the attention of British management academics, although in the light of other results in the survey, we would expect to find differences by subject.

Date of publication

The final variable analysed in the survey was date of publication. For this purpose the date chosen in each case was the year in which the work was first published. Thus, revised editions were treated as having been published in the year of the revised edition, whilst reprints were treated as being published in the year in which the item was first made available for sale.

Although the distribution by date shown in Table 7 shows that books in the survey were published over a surprisingly lengthy period, it also incidates that few of the management 'classics', which have imprints earlier than the time covered by the table, can be in the collection: the message for librarians is that whilst such classics are a necessary part of any adequate business/management collection, they should not expect them to be widely popular. Again, despite the long 'tail', it should be appreciated that nearly 90 per cent of the material was published in the ten years prior to the survey, 54.5 per cent in the 5 years prior to the survey. This 'half-life' computation is much shorter than those obtained in other studies of social science literature, but can probably be ex-

	[*a*]	[*b*] *Authorship cross-tabulation*			[*c*] *Type cross-tabulation*					[*d*] *Date cross-tabulation*		
	Total	*Academic*	*Practitioner*	*Institution*	*Monograph/ Textbooks*	*Readings*	*Essays*	*Cases*	*Reports*	*1960–4*	*1965–9*	*1970–4*
	%	%	%	%	%	%	%	%	%	%	%	%
UK	275 (48.9)	181 (41.4)	74 (74.0)	20 (76.9)	212 (49.2)	19 (35.2)	25 (73.5)	3 (13.6)	16 (80.0)	22.8	46.7	61.3
USA	266 (47.3)	241 (55.0)	24 (24.0)	2 (7.7)	203 (47.1)	34 (63.0)	8 (23.5)	19 (86.4)	1 (5.0)	75.3	48.3	36.3
Other	20 (3.5)	13 (3.0)	2 (2.0)	4 (15.4)	16 (3.7)	1 (1.9)	1 (2.9)	0	3 (15.0)	1.9	5.0	2.4

TABLE 6: *Nationality*

Year	*Items*	*%*	*Cumulative %*	*Year*	*Items*	*%*	*Cumulative %*
1974	9	1.6	1.6	1961	8	1.4	93.8
1973	35	6.2	7.8	1960	5	0.9	94.7
1972	62	11.0	18.8	1959	8	1.4	96.1
1971	67	11.9	30.7	1958	6	1.1	97.2
1970	62	11.0	41.7	1957	5	0.9	98.1
1969	72	12.8	54.5	1956	0	0	98.1
1968	51	9.1	63.6	1955	2	0.4	98.5
1967	42	7.5	71.1	1954	3	0.5	99.0
1966	37	6.6	77.7	1953	0	0	99.0
1965	34	6.0	83.7	1952	1	0.2	99.2
1964	24	4.3	88.0	1951	1	0.2	99.4
1963	18	3.2	91.2	1950	1	0.2	99.6
1962	7	1.2	92.4	1949	0	0	99.6
				1948	1	0.2	99.8

TABLE 7: *Date distribution*

plained by the difference in material being analysed. The typically much longer half-life calculated in other studies is based on analysis of a much wider range of items—I would expect 'key' books to have a shorter life than research material cited by academic authors. Another very interesting fact to emerge from the analysis by date is the small proportion of books with 1974 and 1973 imprints: there appears to be a 2-year lead time before new books become well-known enough to be recommended to business school students. If you add to this lead time the additional delays of the publication process and, in the case of monographs reporting research, the inevitable delay in analysing and reporting results (this project, for example, is based on data collected in mid-1974), it is clear that business studies literature is hardly as topical as some people seem to believe. Of course, there are exceptions—Drucker's *Management-tasks, responsibilities, practices*, for instance, was heavily recommended in my own institution within two weeks of publication. One of the implications for management education is that heavy reliance must be placed on more up-to-date information formats if courses are to achieve the desired topicality.

The implications for librarians are that good journal and other non-book collections should have high priority and that services to exploit such collections to the full (such as contents bulletins) will be of value.

Summary and conclusions

The characteristics of the heavily used books in British business school libraries may be summarized as follows:

1. they are written predominantly by academics, although books by practitioners are gradually gaining ground; academics write virtually all of the 'American' books, whilst practitioners account for a larger proportion of British material
2. the books cover a wide range of subjects
3. textbooks and monographs predominate; case books constitute a sur-

prisingly small proportion of the total and a staggeringly small proportion of the British material

4. over 150 publishers are active in the field although 70 per cent of the material is published by the top 30 publishers
5. there is a fairly even split between British and American material, with a strong trend towards the former
6. 90 per cent of the material is 10 years old or less; there is a 2-year time-lag between publication of books and their recommendation by academics.

It is hoped that the study will add to the theoretical knowledge of librarians and information workers in the business and management field even if, in some respects, the findings merely quantify what some already knew intuitively. The results are, in addition, presented in the belief that they provide practical management information for library and information workers, management educators, publishers and booksellers.

Detailed information such as that presented in this report will become increasingly necessary to librarians if they are able to manage collections efficiently along the lines suggested by the UGC in its recent controversial proposals for 'self-renewing' libraries.[17]

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The value of measurement in decision-making in an Information Unit—a cost benefit analysis

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Paper presented at the Joint Aslib Northern and Midlands Branch Conference, May 1976

Introduction

I HAVE BEEN involved in information work now for some 16 years and during this time the question that I have found the most difficult to answer for other people and in my own mind, is 'what is the economic justification of an Information Service'? I do not think I am alone in this. Many people in our profession are trying to find ways of performing cost benefit analysis of information work but so far with little success. However, information budgets are growing all the time and in the pharmaceutical industry information budgets of over £1m per annum are known.

One result of this large expediture on information with no direct proof of cost benefits is that some managements look very critically at the size of the expenditure and in fact, it is their job to do so. It is my personal belief that although we may not yet be able to demonstrate factually the cost benefits of information work, we should at least try to use facts whenever possible to demonstrate our cost effectiveness and our ability to make sensible decisions. And this means doing measurements to get the facts. There are many areas in information work in which measurements can be made. Some of the areas involve major expenditure and some quite trivial amounts. However, as long as the cost of the measuring process is insignificant in comparison with the cost of the information service or tool being measured, it is worth doing.

I am going to discuss the collection and use of facts or statistical data in a medium-size information unit. I intend to talk about actual examples of measurements which have been made rather than to discuss measurement in a hypothetical sense. I think that the real-life illustrations will be much more instructive than theoretical examples. Some of the examples I will quote involve quite large sums of money whereas others are more trivial. I hope by the end of the paper you will see the value of measurement in an Information Service.

Methods of measurement

I will give one or two examples of how one can measure parts of the work of an information service and then base decisions on the results of these measurements. The examples I am going to present are based on the Beecham Pharmaceuticals Research Division Information Service in which I work. To give you some

Aslib Proceedings, 29 (5), May 1977, p. 189–196. Printed in Great Britain

background on our Information Services, BPRD has several research sites and has information units at each of these sites. The total number of staff in the information services is 31. Therefore you can see that we have a considerable investment in information services and our salary bill is well over £70,000 per annum. The investment is of the order of 4 per cent of the R and D budget.

As in most information services the work of our service tends to divide into (a) library and (b) information services. I intend to give examples of the use of measurements from both functions during this Paper and I will begin by discussing measurements concerning our Information Bulletin.

Information Bulletin

BPRD Information Services produces several publications, the most important and demanding of which is the *Information Bulletin*. This is a weekly bulletin of titles of interest to our research staff which is produced by scanning the current journals and various Current Contents. It costs in the order of £30,000 per annum to produce and takes up a third of our information scientists' time in its production. In view of this cost and the amount of staff time committed to it, it is essential that we can demonstrate to management and to ourselves that the *Bulletin* is worth all this expense and effort. In order to do this we have used two measurements:

1. The relevance of the *Information Bulletin* is measured to check that the scientists are receiving information they require, by providing a request slip with the *Information Bulletin* on which recipients can ask for copies of the items in the *Bulletin*. These request slips are sent in by the scientists when they want a copy of an article in the *Bulletin*. The relevance is measured by the Library staff ticking off the request slips against the *Bulletin* items and then measuring what proportion of the items in the *Bulletin* were requested. This very simple procedure enables us to keep a check on how up-to-date is the knowledge of our information scientists of the research in progress. The relevance check is done periodically and usually gives a result of 50–60 per cent relevance.
2. The detailed investigation of the *Bulletin's* value was achieved by a large amount of customer research. This exercise is reported in *Information Scientist*, 9(1), March 1975, p. 19–28. This was a major exercise involving the information scientists interviewing about 10 per cent of the scientists receiving the *Bulletin* and asking questions regarding the articles of which the scientists requested photocopies from the *Bulletin* using the request slip. These questions included for example: (a) did the *Bulletin* draw the item to your attention or did you see it by some other means? (b) would you describe it as vital to your work, important, peripheral or no interest? (c) would you have seen it in time in sources other than the *Bulletin* and (d) how much time would you have spent on literature scanning if the *Bulletin* were not available?

Results

The results of these interviews showed that the *Bulletin* was justified on at least two counts. The first one was *time saving* (Figure 1); 9 per cent of the items in the *Bulletin* were considered vital to their work by scientists and 45 per cent were

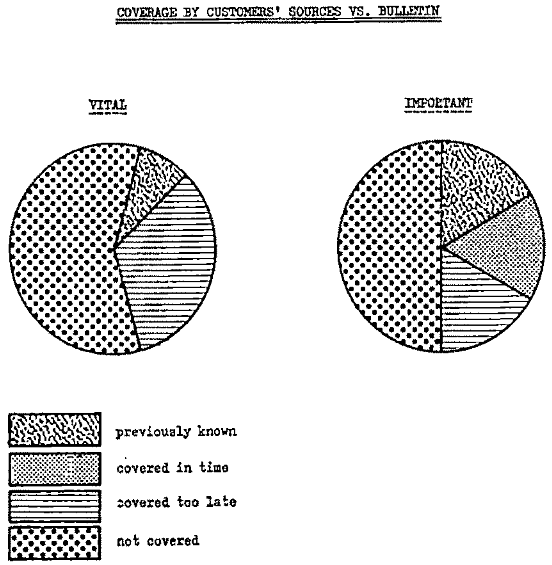


FIG. 1

considered important. For the majority of the vital items the customer considered that a delay of more than one week in the notification of the item would have been excessive and that a delay of more than eight weeks would have been excessive for the important items. *But* for the *Bulletin*, 59 per cent of the vital items and 50 per cent of important items would have escaped customers' notice and a further 35 per cent and 15 per cent respectively would have reached them too late. The time saved by the *Bulletin* was measured as the time the customers would have spent journal scanning (not journal reading), if they had not received the *Bulletin*. Estimates based on the journals a scientist would have scanned but for the *Bulletin* showed that the *cost* of scanning time saved by the *Bulletin* was 4.6 times the cost of the *Bulletin* itself. This is a handsome justification of the *Bulletin* as it shows a net saving of £102,000 per annum and this is a nice figure to be able to put before management. The fact that the measurements show that the *Bulletin* is justified economically came as a great relief to us as BPRD seem to be the only pharmaceutical company which is putting so much effort into the production of an in-house information bulletin and it always makes you feel uneasy when you are the only person treading a particular path. It also makes management uneasy and it is essential that one can provide evidence to quieten their unease.

Length of time of journals on display

One additional measurement we made connected with the *Information Bulletin* was to determine the length of time journals abstracted for the *Bulletin* should be kept on display before sending them on circulation. As I have already explained, we provide a request slip for the *Bulletin* which is returned to the Library if customers want copies of items. We measured the time of receipt of

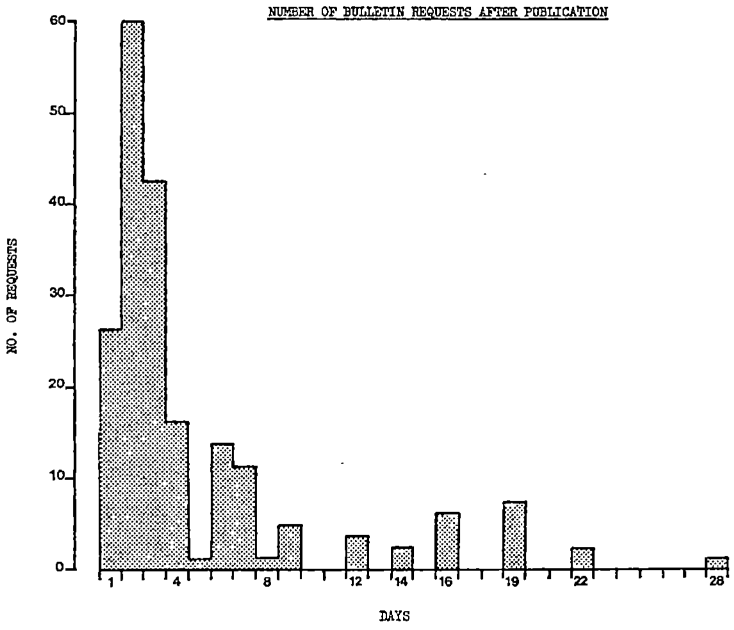


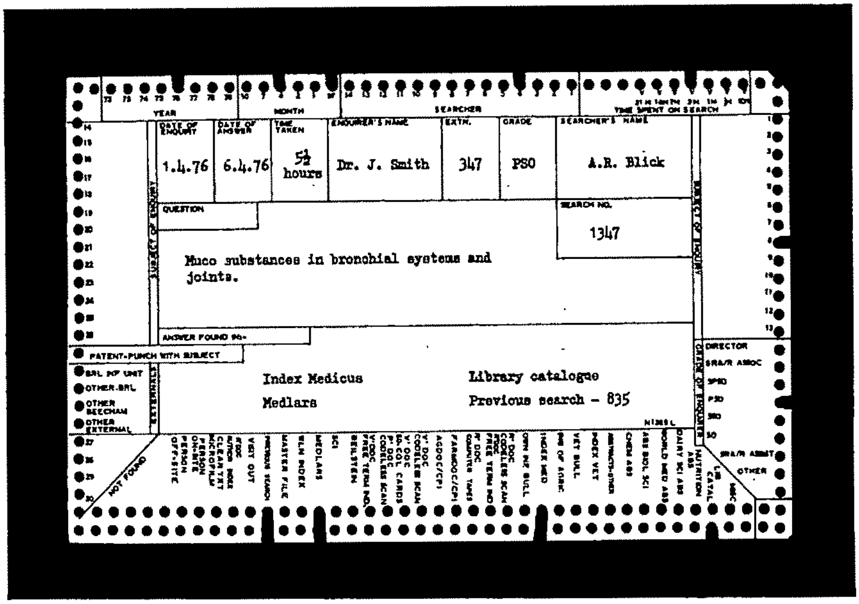
FIG. 2

these requests (Figure 2) and we found that about 80 per cent of them were received within eight days of the *Bulletin* issue. Thus by holding the journals on display for eight days after the issue of the *Bulletin* we can arrange to answer 80 per cent of the copy requests with little difficulty. After the journals have gone on circulation, of course, it becomes much more difficult to obtain them for photocopy purposes. This simple measurement and the consequent decision has saved a considerable amount of Library effort in chasing journals for copying. Incidentally photocopying is a serious problem as we do of the order of 5,500 photocopy pages per *Bulletin* issue.

Search statistics cards

As previously discussed the *Information Bulletin* takes up a third of the information scientists' time. A further third of their time is taken up on literature searches and we also make measurements in this area of work. A considerable number of useful measurements are obtained by the use of a search statistics card. A detailed explanation of the card can be found in the *Information Scientist* 8(6), June 1974, p. 75–8. See Figure 3.

Each time a literature search is completed a search statistics card is filled in. You can see from the card that it then can be used to measure or determine a range of details about the searches. I would point out that the double holes at the bottom of the card are used to indicate the use of a search tool and also its success. That is, if Medlars is used as a search tool the outer hole is punched out. If a successful answer is received from Medlars then the inner hole is also



YEAR
MONTH
SEARCHER
TIME SPENT ON SEARCH
SUBJECT OF ENQUIRY
PATENT-PUNCH WITH SUBJECT
BRL INF UNIT
OTHER BRL
OTHER BEECHAM
OTHER EXTERNAL
EXTERNALS
GRADE OF ENQUIRER
DIRECTOR
SRA/R ASSOC
SPSO
PSO
SSO
SO
SRA/R ASST
OTHER
NOT FOUND
MEDLARS
MASTER FILE
PREVIOUS SEARCH
SCI
BEILSTEIN
INDEX MED
VET BULL
INDEX VET
CHEM ABS
WORLD MED ABS
DAIRY SCI ABS
NUTRITION ABS
LIB CATAL
MISC

DATE OF ENQUIRY	DATE OF ANSWER	TIME TAKEN	ENQUIRER'S NAME	EXTN.	GRADE	SEARCHER'S NAME
1.4.76	6.4.76	5½ hours	Dr. J. Smith	347	PSO	A.R. Blick

SEARCH NO. 1347

QUESTION

Muco substances in bronchial systems and joints.

ANSWER FOUND IN-

Index Medicus
Medlars
Library catalogue
Previous search - 835

FIG. 3

punched out. By needle sorting on the outer hole one can determine how frequently Medlars has been used as a search tool. By needle sorting these selected cards on the inner hole it is then possible to see how successful it has been in answering the query. Examples of the use of this card in giving information useful to decision making are shown in Figures 4 and 5. Figure 4 shows how there has been an increase in the number of enquiries by year in BPRD Information Services. However, when this is shown as a measure of the number of hours spent searching it can be seen that there has been a reduction in the time spent searching. This information is very useful when discussing staffing requirements. Figure 5 shows the results of measuring the use of the literature searching tools from the double row of holes on the cards as I previously explained.

Literature tools

The measurement of the use of literature tools and their success rate is most important. Many literature tools are very expensive and it is important that one can demonstrate that their continued purchase is necessary. We are at the mom-

Year	1970	1973	1975
Number of searches	235	557	637
Time spent on searches (hours)	890	2,550	2,000

FIG. 4:

Tool	*% Use*	*% Success*
Ringdoc computer	40.0	72.4
Miscellaneous	23.0	72.6
Chemical abstracts	22.4	73.2
Index Medicus	18.6	78.0
Farmdoc/CPI	17.4	67.3
Previous search	17.0	12.9
Science citation index	15.1	81.3
WLN Index	9.1	68.9
Visit out	9.1	93.1
Person off-site	8.2	76.9
Medlars	7.6	83.3
Ringdoc codeless scan	6.6	90.5
Own info. bulletin	5.6	52.6
Ringdoc free term index	4.4	50.0
Library catalogue	4.1	38.5
Abstracts (other)	2.8	55.5
Master file	1.3	75.0
Person on-site	1.3	100
Theilheimer	0.6	100
Ringdoc author index	0.6	50.0
Cleartext microfilm	—	—

FIG. 5: *Tools used at BPRD Brockham Park (ranked in order of frequency of use)*

ent considering the purchase of the 9th cumulative *Chemical Abstracts* index which, with a copy for all 4 sites, will cost about £14,000. This is equivalent to purchasing 7 small family saloon cars—a sobering thought and one which puts the expenditure into perspective. An example of a decision we have made based on these results concerns the Derwent Vetdoc tool. This Vetdoc tool costs of the order of £1,200 per annum and in the first few years of its purchase it was used extensively. However, recent measurements show that the use is now very low and we have cancelled our subscription, thereby saving £1,200 per annum. We are also looking critically at one or two other tools which have a very low use, for example Theilheimer. However, the use of the information does not always have to be in a negative manner. For example we can now demonstrate that the use of the WLN index to our in-house compounds is sufficiently high for us to make a strong argument for the purchase of the Crossbow program for computer searching of our WLN records. Another decision based on these use measurements affected our central filing system, called the Master File. This Master File houses all our in-house documents and in recent years has been growing very rapidly. We have given serious consideration to the possibility of installing sophisticated indexing and retrieval techniques such as ultra-fiche linked to computer retrieval. However, despite the Master File growing very rapidly in size the use of it as a search tool is very low and on the basis of this we are able to make a rational decision to have a quick and dirty retrieval system in the Master File because this gives the right balance of effort. As we are filing and indexing a very large number of documents but are retrieving them very infrequently it is sensible that the minimum effort should go into the filing and indexing even if this involves a lot of effort in retrieval. Without the use measurements of the Master File it would have been difficult to determine what was the correct balance and hence the correct approach to take.

Measurement of journal holdings

An example of the measurements we perform in the Library areas concerns journal holdings. BPRD Information Services subscribes to about 500 journals, many as multiple copies. This means our annual journal subscription cost is a considerable part of the Information Services budget. Journal subscriptions raise several problems which require decisions. Amongst these are (a) is a journal subscription necessary, (b) should the journal be bound and (c) how

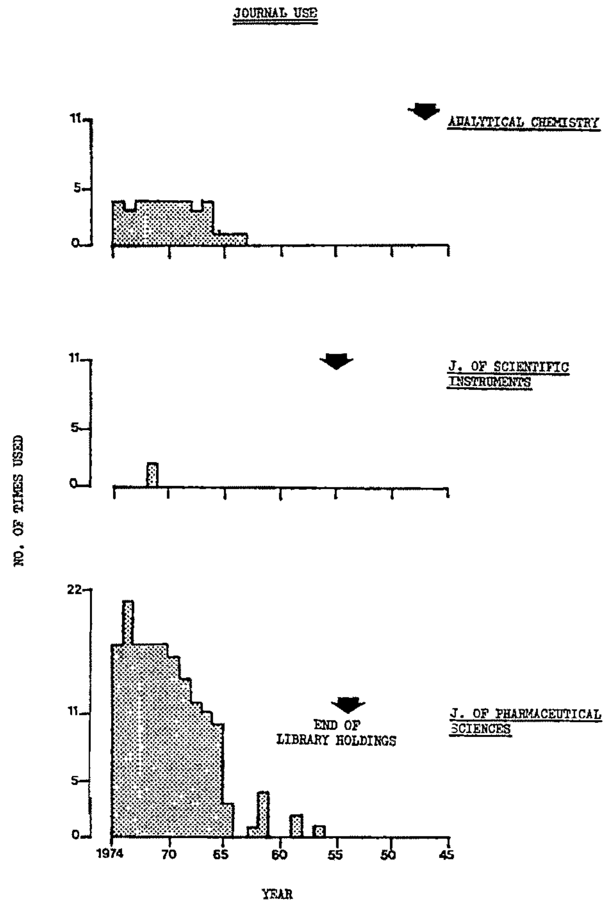


FIG. 6

long a back-run of the journal should be kept. Questions like these cannot be answered without first doing some measuring to get at the facts. One such measurement we have just completed is of the use of the pre-1975 stock of journals in the Library at our Worthing site. A large journal use card was attached to the shelving on which the journals were held and large notices were posted in the Library asking customers to initial the cards whenever they used a particular journal.

Both customers and Library staff completed the cards for a 3-month period whenever they used a journal. Some of the use figures for the back-runs of these journals are shown here (Figure 6). You can see that on this basis it is possible to decide which journals are used extensively throughout the holding period and should perhaps therefore be bound and which journals are used so infrequently that there is no point in having them in the Library taking up valuable shelf space. It is reasonable as a rough guide to say that if it is cheaper to obtain the year's requirements of requests for articles in a journal as photocopies from the British Library than it is to bind and shelve the annual volume then the backlog should be ditched. I accept that this ignores the convenience of having the journal on the shelf but as space runs out it is necessary either to throw away or to purchase on microfilm. No library can hold its back-run stocks for ever. However, librarians should not dispose of journals on the basis of intuition, but on the basis of measurement. I realize that Bradford and others have more sophisticated approaches to journal redundancy but what I have described is an almost labour-free way of getting some hard facts on which to base decisions.

Summary

The examples of measurements I have talked about have been just an illustration of what can be done with very little effort to provide hard facts on which to base decisions in information work. I accept that the facts do not necessarily paint all the picture but I am sure you will agree that the collection of the facts can do nothing but help to make your decisions the correct ones. In all the examples I have discussed, the cost of obtaining the basic facts has been trivial in comparison with the sums of money involved in, for example, the production of the *Bulletin*, the purchase of search tools, or the journal subscription bill.

Research into the practical results of on-line information retrieval: an extensive analysis

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Bibliography Department, Library,
Delft University of Technology

This paper describes the results of an extensive search into two factors which effect, to a high degree, the efficiency of on-line information retrieval. These two factors are firstly the manner by which keywords are chosen as a means of retrieval by the reviewers of the reference work and secondly the degree with which papers with comparable contents are accorded similar keywords. The influence of these two factors on the practical results of on-line retrieval is shown by the example of two extensive searches: these searches were done manually as well as on-line. From these two methods it is then possible to compare what is retrieved by the computer and what is in reality available.

Introduction

THIS PAPER PURPORTS to further investigate one of the problems which is mentioned by E. C. Goodliffe and S. J. Hayler in their paper: 'On-line information retrieval: some comments on the use of Retrospec 1 in an industrial library' in *ASLIB Proceedings* 26 (5) May 1974, p. 177–88. One important conclusion was summarized as: 'The manual search produced a more comprehensive answer for the enquirer'. This conclusion was the result of five individual searches carried out manually as well as on-line (Retrospec 1). Statistics concerning the number of references found, relevancy, number of references of interest substantiate this conclusion, *i.e.* a manual search can produce more efficient and positive results for the user. This is a very important aspect for libraries to consider before resorting to the computer as the 'final answer'. Consequently, this report is a cumulation of a similar procedure as mentioned above, involving a precisely described subject chosen from the *Electrical and Electronics Abstracts* and searched in the INSPEC data base. The searches covered the period from 1971 up to and including June 1976.

Subject

The literature search deals with the following subject: an electrical dealer wants a comprehensive search on *off peak electrical space heating* systems for individual houses, for the most part, *storage* systems, including *cost* of investment, installation, maintenance and electricity supply. He is not interested in heat pumps, neither in exclusively large systems nor in literature that only concerns the control of the installation.

Aslib Proceedings, 29 (5), May 1977, p. 197–208. Printed in Great Britain

Definitions

The following definitions will apply throughout this report:

Subject Heading:	word(s) from a controlled vocabulary, in this case the INSPEC Thesaurus.
Free Term:	word(s) which may be chosen from the title and/or abstract of a document for the purpose of facilitating retrieval.
Keyword:	a Subject Heading or a Free Term (Free Term here is a single word)
Indicator:	may be a word or a group of words equal in sense to—or one of—the six underlined words from the subject. (In this report we are concerned with the six indicators and all their possible synonyms listed in Table 1.
Abstract Indicator:	an indicator that is chosen from the Subject Index, and/or abstract and/or title of a document by the author of this report.
Keyword Indicator:	an indicator, in the form of a keyword, assigned to an abstract by the reviewer of the reference work.

Procedure

A. *Steps of procedure*:

Step 1: The search was carried out by ESA-terminal via the INSPEC data file, period 1971 up to and including 1975, using the most likely keywords.
(Space heating; off peak; storage; cost, costs).

Step 2: A search was done manually with the printed edition from '*Electrical and Electronics Abstracts*', period 1971 up to and including 1975.

Step 3: A print-out was made from the relevant references (the results of Step 1 and Step 2).

Step 4: All keywords from the prints were listed in alphabetical order.

Step 5: From the keywords from Step 4 were chosen all those which could be somehow used as keywords for the subject of this particular search.

Step 6: A search was carried out by ESA-terminal via the INSPEC data file, period 1971 up to and including 1975, using all keywords mentioned in Step 5 (discussed in section on 'Searches' p. 203).

Step 7: A search was done manually with the printed edition from '*Electrical and Electronics Abstracts*, period January 1976 up to and including June 1976.

Step 8: A print-out was made from all newly found relevant abstracts from Step 6 and Step 7.

Step 9: Out of the keywords from Step 8 were chosen all those which could be somehow used as keywords for the subject of this particular search.

Step 10: The keywords from Step 9 are added to those from Step 5.

Step 11: A search was carried out by ESA-terminal via the INSPEC data file, period 1971 up to and including June 1976. Perfect combinations were carried out using all keywords mentioned in Step 10 (result see section on 'Searches' p. 203).

No new relevant references were found by Step 11. The total result from Step 1 up to and including Step 11 was 74 relevant references.

The references are exclusively reviewed from the Subject Index, and the text of the abstract, including the title. Not from the original document.

B. *Dividing the subject into indicators*

The subject has 6 indicators:

1. electric(al)
2. domestic space
3. heating
4. off peak
5. storage system
6. cost

A relationship is made between INSPEC's keywords (Subject Headings and Free Terms) and the above mentioned indicators. This relationship is shown in Table 1. The Subject Headings are designated by the sign O; the Free Terms are divided into individual words and designated by the sign X.

C. *Dividing the subject into parts*

The subject is then divided into three parts in order to make a good analysis:

1. electrical space heating systems: working during the off peak hours (direct and storage systems). This description is the most relevant and gets the indicators 1, 2, 3 and 4.
2. electrical storage, space heating systems: by this description it is probable that the storage takes place during the off peak hours. Above all, this description excludes the off peak direct space heating system. Indicators 1, 2, 3 and 5.
3. the costs of electrical space heating systems: using this description there could also be something to find out about the costs from an off peak system. Indicators 1, 2, 3 and 6.

For this particular subject it is important to note that in the 1973 Subject Headings (INSPEC) 'Space heating' is introduced as a sub-heading under the Subject Heading 'Electrical heating'. However, from the years 1971–2, the term 'Space heating' was not included in the Subject Headings list.

Analysis

1. *A theoretical view*

All 74 relevant references found under Step 1 up to and including Step 11 of the procedure include the 'abstract indicators' 1 and 2 and 3 and (4 and/or 5

Subject headings	*Indicators*					
	1	*2*	*3*	*4*	*5*	*6*
Space heating	O	O	O			
Electric heating	O		O			
Heating			O			
Domestic appliances		O				
Energy storage					O	
Economics; tariffs						O
Free terms						
electrocentral	X	X				
electric; electrical	X					
building(s)		X				
central		X				
domestic		X				
dwelling(s)		X				
floor; floorwarming		X				
house(s); housing		X				
indoor		X				
residential		X				
room		X				
space		X				
underfloor		X				
heat; heater(s)			X			
heating			X			
warming			X			
night power				X		
night rates				X		
night storage				X		
off peak				X		
off-peak; offpeak				X		
white meter				X		
accumulation					X	
accumulator(s)					X	
storage					X	
store(s)					X	
cost(s)						X
economics						X
tariff(s)						X

TABLE 1: *Relationship between INSPEC'S keywords and the 6 indicators*

and/or 6): 1*2*3* (4+5+6). To retrieve these same references by on-line information retrieval, it is necessary that these items have one or more keywords from indicator 1 and 2 and 3 and (4 and/or 5 and/or 6): 1*2*3* (4+5+6).

74 items contain the abstract indicators (1*2*3).
29 items contain the abstract indicators (1*2*3*4).
56 items contain the abstract indicators (1*2*3*5).
30 items contain the abstract indicators (1*2*3*6).

The following overview (Table 2) shows the difference between the number of keywords, according to the abstract, which are possible and the number which in reality are assigned (p. 202).

In the theoretical case, perfect combinations are carried out with all keywords mentioned in Table 1. Because some items are missing all keywords from indicators 1 and/or 2, there are from all 74 items, by applying the combination in the indicators 1 and 2 and 3 (1*2*3), never more than 59 references to be found. If a following indicator is added, even less is to be found.

Going from year to year, the percentage of items assigned according to their abstracts ranges from 0–100. As of an average, over the period 1971 up to and including June 1976, only 45–79 per cent is to be found, which according to the abstract is in reality available.

Factor 1:
The fact that some Subject Headings and/or Free Terms are not assigned by the reviewers of the reference which should have (or could have) been assigned according to the text (contents) of the abstract.

2. *A practical view*

Not only is the assignment of the indicators in general important, but also in practice, one is to a very high degree dependent on the frequency of similar keywords assigned to items with similar abstract indicators.

Table 3 shows these aspects: No more than 7–20 per cent from the items with similar abstract indicators in this example, have similar keywords for those indicators. This low percentage is brought about through 'Factor 1' but as well through the large quantity of synonyms and spellings that there can be for one word or idea, for example: by indicator 4: night power, night rates, night storage, off peak, off-peak, offpeak, white meter.

The positive influence of the Subject Heading 'Space heating' is clear: No more than 7–13 per cent from the items from 1971–2 have similar keywords, and from 1973–6 the percentage of items with similar keywords is higher: 15–39 per cent. A precise coding by the reviewers with 'Space heating' should increase this percentage from 23–69 per cent.

Factor 2:
The large quantity of synonyms and spellings that there can be for one word or idea.

The Free Term system has many disadvantages:

1. Each author and/or abstract writer has in principle the right to add keywords in his own subject language and this does not have to be in uniform written language.
2. In such a way there arises an enormous diversification, which can be limited to some degree by a definite selection from Subject Headings or Classification Codes by the reviewers of the reference.
3. The large amount of keywords suggest an accuracy that in reality is not present, because the keywords are not consequently applied.
4. The keywords can be recognized passively in a printed subject index.

Year	*According to the abstract*	*Actually assigned by keywords*	%
	Number of items with indicator 1 and 2 and 3		
1976 up to June	8	8	100
1975	10	9	90
1974	12	11	92
1973	8	8	100
1972	16	12	75
1971	20	11	55
TOTAL	74	59	79
	1 and 2 and 3 and 4		
1976 up to June	1	0	0
1975	7	3	43
1974	2	0	0
1973	3	3	100
1972	6	2	33
1971	10	5	50
TOTAL	29	13	45
	1 and 2 and 3 and 5		
1976 up to June	7	4	57
1975	9	7	78
1974	8	7	88
1973	4	3	75
1972	13	7	54
1971	15	5	33
TOTAL	56	33	59
	1 and 2 and 3 and 6		
1976 up to June	3	3	100
1975	2	2	100
1974	8	7	88
1973	3	3	100
1972	7	5	71
1971	7	3	43
TOTAL	30	23	77

TABLE 2: *Difference between the number of keywords which according to the abstract are possible and the number actually assigned*

However, it can not be expected that these Free Terms are all chosen by the searcher.

5. When one attempts to think up all of the keywords belonging to a subject, it is more than probable that the list is too great and one is not able to

Year	*According to the abstract available in:*	*Largest number of items with similar keywords in:*	*%*
		1 and 2 and 3 and 4	
1973 up to June 1976	13	2 (Co1)	15
1971 and 1972	16	2 (Co2, Co3)	13
1971 up to June 1976	29	2 (Co1, Co2, Co3)	7
		1 and 2 and 3 and 5	
1973 up to June 1976	28	11 (Co4)	39
1971 and 1972	28	3 (Co5)	11
1971 up to June 1976	56	11 (Co4)	20
		1 and 2 and 3 and 6	
1973 up to June 1976	16	6 (Co6)	38
1971 and 1972	14	1	7
1971 up to June 1976	30	6 (Co6)	20

Co1 Space heating * night * storage
Co2 = electric * central * heating * off * peak
Co3 = electric * indoor * heating * offpeak
Co4 = Space heating * storage
Co5 = Electric heating * central * storage
Co6 = Space heating * cost(s)
Co means combination

TABLE 3

work with it. The search becomes expensive and one makes mistakes easily.

The searches

1. *Keywords used and combinations carried out*:

Search 1:
See first Step 6, under 'Procedure'.
Set numbers A1, B1, C1, A2, B2, C2, A3, B3, C3, B4, C4.
The meaning of all keywords here is: all keywords from Table 1, except 'Energy storage', 'rates', 'residential', and 'underfloor'.

Search 2:
See first Step 11, under 'Procedure'.
Set numbers A11, B11, C11, A12, B12, C12, A14, C14.
The meaning of all keywords here is: all keywords from Table 1, except 'residential'.

The following combinations are brought in table form:

Set A1; A11: combinations with all the keywords from indicators 1, 2, 3 and 4 (1*2*3*4)
Set B1; B11: combinations with all the Free Term keywords out of the indicators 3 and 4 (3*4)
Set C1; C11: combinations with the most likely keywords (to be used) for for the indicators 1, 2, 3 and 4: (1*2*3*4)
C1: Space heating; night* storage; off* peak; C11: Space heating; off*peak
Set A2; A12: combinations with all of the keywords out of the indicators 1, 2, 3 and 5 (1*2*3*5)
Set B2; B12: combinations with all of the Free Term keywords out of the indicators 3 and 5 (3*5)
Set C2; C12: combinations with the most likely keywords (to be used) for the indicators 1, 2, 3 and 5 (1*2*3*5) Space heating; storage
Set A3: combinations with all of the keywords out of the indicators 1, 2, 3 and 6 (1*2*3*6)
Set B3: combinations with all of the Free Term keywords out of indicators 2, 3 and 6 (2*3*6)
Set C3: combinations with the most likely keywords (to be used) for the indicators 1, 2, 3 and 6 (1*2*3*6) Space heating; cost(s)
Set B4: set A1+B1+A2+B2+A3+B3
Set C4: set A3+B3+C3
Set A14: combinations with all of the keywords out of the indicators 1 and 2 and 3 and (4 and/or 5 and/or 6): 1*2*3* (4+5+6)
Set C14: combinations with the most likely keywords (to be used) for the indicators 1 and 2 and 3 and (4 or 5 or 6): 1*2*3* (4+5+6) Space heating; off peak; storage; costs, cost or cost(s).

2. *Data from the searches*

Tables 4, 5 & 6 shows:

a. how many keywords by the above-mentioned sets one must feed in,
b. how many combinations are made from these,
c. how many items are contained in the formed sets,
d. how many items from that are relevant,
e. the percentage of relevant items per set,
f. the percentage of relevant items from the subject part, respectively the main subject.

Conclusions

The conclusion concerns the following two results and it is possible, but not necessary, to apply this to other examples and other reference works.

1. The main effectiveness of the keywords (delegated to the abstracts by the reviewers of the reference work) which represents the contents of these abstracts is about 62 percent. It is shown in the data tables that although the

Concerning Appendix:†	*Appendix Tables 1 and 2*			*Appendix Tables 3 and 4*			*Appendix Tables 5 and 6*			*Main Appendix Table*	
To find according to the abstract indicators	28 items			49 items			27 items			66 items	
Set	A1	B1	C1	A2	B2	C2	A3	B3	C3	B4	C4
Number of keywords used											
by 'Expand'	25	11	5	19	5	2	21	16	2	27	5
by 'Select'	34	14	5	31	11	2	31	26	3	44	6
Number of combinations made	9	6	3	6	3	1	6	5	1	11	2
Number of references in the set	13	30	4	57	237	21	60	91	16	324	35
Number of relevant references in the set	10	18	3	28	37	10	22	22	5	59	14
Percentage of relevant references in the set	77	60	75	49	16	48	37	24	31	18	40
Percentage relevant from the portion/main subject	36	64	11	57	76	20	81	81	19	89	21

* The keywords 'Energy storage', 'rates', underfloor' and 'residential' are not used in search 1.
† An extensive Appendix is available from the author.

TABLE 4: *Data from search 1: 1971 up to and including 1975**

Concerning Appendix:†	*Appendix Table 2*			*Appendix Table 4*			*Main Appendix Table*	
To find according to the abstract indicators	16 items			28 items			36 items	
Set	A11	B11	C11	A12	B12	C12	A14	C14
Number of keywords used by								
'Expand'	27	12	3	22	6	2	30	5
'Select'	36	15	3	33	12	2	47	6
Number of combinations made	9	6	1	6	3	1	11	2
Number of references in the set	9	20	—	28	101	—	51	—
Number of relevant references in the set	6	11	—	12	18	—	21	—
Percentage of relevant references in the set	67	55	—	43	18	—	41	—
Percentage relevant from the portion/main subject	38	69	—	43	64	—	58	—

* The keyword 'residential' is not used in search 2.

† Appendix available from author.

TABLE 5: *Data from search 2: 1971 and 1972**

Concerning Appendix:†	*Table 1*			*Table 3*			*Main Table*	
To find according to the abstract indicators	13 items			28 items			38 items	
Set	A11	B11	C11	A12	B12	C12	A14	C14
Number of keywords used by								
'Expand'	27	12	3	22	6	2	30	5
'Select'	36	15	3	33	12	2	47	6
Number of combinations made	9	6	1	6	3	1	11	2
Number of references in the set	9	14	2	42	176	23	80	39
Number of relevant references in the set	6	8	1	20	22	11	30	16
Percentage of relevant items in the set	67	57	50	48	13	48	38	41
Percentage relevant from portion/main subject	46	62	8	71	79	39	79	42

* The keyword 'residential' is not used in search 2.

† Appendix available from author.

TABLE 6: *Data from search 2: 1973 up to and including June 1976**

abstracts get a high number of keywords, only 45–79 per cent of them were completely coded with the keywords required for this subject. So that even when *all* relevant accorded keywords are used and perfect combinations are carried out with them, no more than 45–79 per cent of the abstracts can be retrieved. This also lends to the following conclusion:

2. The practical efficiency of the above-mentioned keywords in view of the many words to express a subject (i.e. synonyms and various spellings) is a very low percentage. The percentage of abstracts with comparable contents and accorded similar keywords was only 7–20 per cent. If the searcher chooses keywords which are occuring even less frequently, the efficiency of the search becomes even smaller.

- A very precise coding by the reviewers of the reference work, chosen from a standardized thesaurus, seems to be essential to increase the efficiency of on-line information retrieval.

BRIEF REVIEWS

American Men and Women of Science: ed. Jaques Cattell Press. 13th ed. 1977. Bowker, 7 volumes. £190.00. (ISBN 0 8352 0866 4.)

The new (13th) edition of American Men and Women of Science will be welcomed by many libraries since the 12th edition, published in 1972, must by now be significantly out of date and there is no other directory of this type with comparable coverage and size. The 13th edition comprises 7 volumes and contains 111,000 entries. Publication has been achieved in an impressive ten months as compared to three years for the previous edition. All the entries from the last edition have been checked before re-entry or omission and, where no current information on the scientist was obtainable, a reference has been made to the 12th edition. References are given to scientists who have died since publication of the last edition. Over 12,000 new entries have been included.

The directory lists US and Canadian scientists including those working abroad and it covers the 'physical, biological and selected social sciences'. The subject coverage is regrettably not as wide as in previous editions. Sociology, psychology and political science, previously covered in two additional volumes on the social and behavioural sciences, have been omitted. The reason given is that they are 'fully covered by membership directories in each field'. Engineering and economics are to appear in separate directories.

The 7th volume contains a discipline index with 79 main subject headings which are subdivided and a geographical index. The print size has been reduced but remains readable, and the biographical information given is as full and concise as in the last edition.

ANDERS, MARY EDNA. Libraries and library services in the Southeast: a report of the Southeastern states cooperative library survey, 1972–1974. Prepared for the Southeastern Library Association, Alabama, University of Alabama Press, 1976. 263 pp. $10. (ISBN 0 8173 9705 1.)

This is the first survey of its kind carried out since 1946/7. Librarians had expressed a need for a survey to provide a data base for regional planning for library development. A supplementary volume gives the statistical data collected. The survey covered libraries and library-related agencies in Alabama, Florida, Georgia, Kentucky, Mississipi, North Carolina, South Carolina, Tennessee and Virginia. Major omissions were county law libraries, libraries of commercially operated business and trade schools and libraries of individual churches. The following aspects were investigated: geographical or other definition of area served; financial support; materials held; personnel; personnel practices; types of service extended; types of people served; physical quarters and equipment. More effective use of existing resources is advocated, in co-operative planning, for example. Specific recommendations for the Southeastern Library Association are made.

DE KEYSER, E. *ed.* The European Offshore Oil and Gas Yearbook 1976/77. Kogan Page, 1976. 475 pp. £20.00. (ISBN 0 85038 4311.)

Information previously given in the *U.K. Offshore Oil and Gas Yearbook* has this year been included in the European version so that fifteen European countries now receive extensive coverage in this volume. The areas covered are the North Sea, Atlantic, Mediterranean, Aegean, Celtic Sea and Irish Sea. The Yearbook is in five main parts. Part 1, entitled 'Europe—the current situation', contains articles commissioned from various authors. Part 2 (174 pages of the total 475) is a country by country guide to offshore activities. It includes summaries of energy production, consumption, imports and exports. Resources, government policies, harbours, etc., are discussed briefly. Maps are included and addresses for licensees are given. The UK section is the fullest, containing a map of block offshore allocations and detailed regional information. Part 3 discusses the COMECON countries and part 4 legislation and regulations in the 15 European countries. Part 5 (137 pages) is a directory of manufacturers and services. These are divided by subject and subdivided by country but there is also an alphabetical index. Other information included is a list of oil refineries with capacities, list of abbreviations, and an introduction showing a ten-year pattern of energy consumption by country worldwide.

MCHALE, J. The changing information environment. London, Elek, 1976. 117 pp. illus; tables; refs. £2.95 (pbk). (Environmental studies.) (ISBN 0 236 40052 5.)

This is a general study of contemporary society, loosely put into an information framework. The direction is from specific to general, so the first chapter is on information, technology and communications and covers developments in computer technology and the interaction of information and communication technology. The progression towards the final chapter, global aspects, is via changes in the nature of resources, the individual and society, education and culture, business and management and the political process. Information is the new social wealth because no resource can be exploited without information. Information technology has the following effects: changes in management style and nature; trend towards increased social awareness; trend towards convergence of public and private organizations. The author questions the aims and values of contemporary society, *e.g.* is formal education for everyone really necessary or would on-site training for a particular job be more useful and fulfilling for the individual. The general change in society and its effects on the information environment are amply documented.

YESCOMBE, E. R. Plastics and rubber: World Sources of Information. London, Applied Science Publishers, 1976. 547 pp. £15. (ISBN 0 85334 675 5.)

A large proportion of this source is devoted to references to the literature of plastics and rubber, conveniently subdivided by subject and including references to periodical articles as well as books and reports. However it is much more than just a bibliographic guide but also contains a certain amount of factual information which precedes and provides useful background to the subject bibliographies. Other features to be noted are the index to acronyms used in the text, a section providing details of both national and international bodies and descriptive and bibliographic details of secondary sources. Whether the user's interest is technical, commercial or statistical he will find advice and guidance to a wide variety of sources which should lead him to the information he is seeking.

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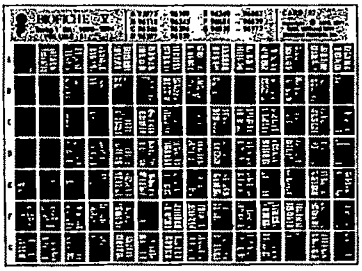

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Printed at the Alden Press, Oxford

ISSN 0001 253X

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Aslib Proceedings

VOLUME 29 JUNE 1977 NUMBER 6

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The British Library automated information service

P. L. Holmes

British Library Bibliographic Services Division

THE BRITISH LIBRARY Automated Information Service (BLAISE) is a new name in the library and information world. It is in essence an on-line library housekeeping and information service which is being created by the British Library based on established information retrieval software. The Library will use the ELHILL IIIC software package which is run by the National Library of Medicine in the USA. BLAISE will provide on-line access to the MEDLARS and the MARC files with access to the former in the spring of 1977 on an IBM 370 computer at a bureau in Harlow, Essex.

BLAISE will be a fully operational, British Library service and will fill the gap before the Library can put its own software (the MERLIN software) onto a UK-developed computer in this country. BLAISE will have a minimum three years and the Library hopes, through BLAISE, to build up a market for on-line library and information services so that it will know best how to develop the services of MERLIN and to gain experience of on-line operations for the future.

The main features of BLAISE are on-line and off-line retrieval of records from the MARC and MEDLARS files; on-line editing and checking of references that have been retrieved using the ELHILL software; on-line input of new records and both on-line and off-line output of records including a special feature to enable users to take the records they have retrieved and created with BLAISE through to the Library's Local Cataloguing Service (LOCAS). The bio-medical files available will include MEDLINE, SDILINE, TOXLINE, CHEMLINE, MEDLARS BACKFILES and TOXBACK. The shared MARC files will include current and retrospective UK MARC (1950 to date), LC MARC (foreign and English language, 1969 to date), BL, DPB and other BL records and extra MARC material from users of the cataloguing service.

The main uses seen for BLAISE include subject-type searching. The retrieval system will allow searching with a range of index terms and for the first time users in this country will be able to exploit the MARC tapes to provide information services to users and in particular to provide bibliographies as required both by the library and by library users. The retrieval system will allow record selection for cataloguing purposes using a variety of search keys in addition to the ISBN, LC, BNB number. BLAISE will support many library operations including cataloguing. Book ordering, acquisitions and inter-library loans can be aided by having records available for inspection on-line for bibliographic checking. Finally, the Library will provide a document request service to enable users to translate references retrieved by subject or checked bibliographically on-line into requests for documents from its Lending Division.

BLAISE has some novel features. The combination of an information re-

Aslib Proceedings, 29 (6) June 1977, p. 214–220. Printed in Great Britain

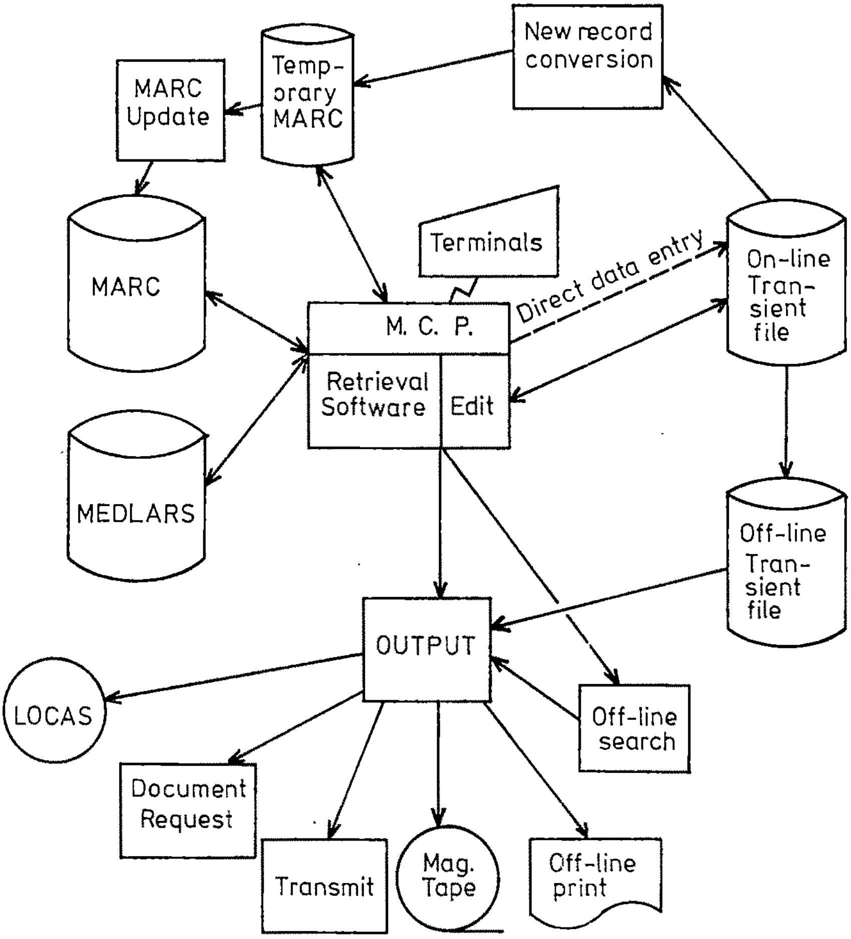

FIG. 1: *The Blaise system*

trieval package such as ELHILL with the software which is being written specifically for the cataloguing activity is very powerful and appears to be unique. BLAISE will have a major function in the developing national network, where it will act as a central source of records for libraries to use for their local library purposes, using their own small computer systems as appropriate. The document request service is also a unique facility in the way the Library proposes to develop it.

The BLAISE system is complicated (Figure 1) and it is easier to understand if considered in four sub-systems. The edit system will enable people to take records and amend them and to add new records to the system. The link between the edit sub-system back to the retrieval sub-system for searching of the new records will be undertaken through the MARC update sub-system. Users will be able to come into the BLAISE system using teletype-compatible and later on other intelligent terminals similar to the IBM 2780 and will be able to access the data bases in real time using the ELHILL software. The software is well known and well documented. It will enable users to retrieve records very easily from the MARC and MEDLARS files and to have the records output either on-line through local visual display units or printers or off-line for printing and despatch to users overnight.

Certain data elements from the record will be available for searching in the BLAISE system. For the MARC file, data elements will be selected from the fields and put into an index file which can be searched. This index file will contain, for example, control numbers including ISBN, LC card number and BNB number; classification codes; author names; words taken from the title of the item and subject headings. A full list of search terms for MARC is given in Appendix 1. A BLAISE user seeking particular items, perhaps with the books in hand, puts in a string of ISBN numbers and retrieves the full records, seeing part or all of the records on-line. The system, however, will enable him to input a variety of search terms, perhaps the author combined with the classification code, etc. He can use the boolean operators to provide a complex search and retrieve a number of references which match the search request. He can also locate records for cataloguing purposes using the author or some other data element as an alternative to the ISBN. This should lead to a much greater rate of hits for library cataloguing purposes.

The inverted file structure of the ELHILL system is visible to the user through use of the 'NEIGHBOR' command. The user of the 'NEIGHBOR' command will be shown a portion of the alphabetical index file. If, for example (Figure 2) he puts in the word 'FRANCE', the 'NEIGHBOR' command will show him that the term occurs as a MEDLARS index term, (MH) 1763 times, as a place of publication, (PL), 24457 times, as a word in a title or abstract, (TW), 222 times and as various authors (AU), once each. In this way, the user can see precisely how the bibliographic items have been indexed and can select appropriate terms or spellings of terms to use for retrieval. He can also say whether

Display of the inverted file using the 'neighbor' command

```
SS 1/C?
User:
'Neighbor France 10'
Prog:
Postings             Term
   1              Francalanci CP (AU)
   1              Francavilla A (AU)
   1              Francaz JM (AU)
   1              Francois J (AU)
   1              Francois P (AU)
 1763             France (MH)
24457             France (PL)
  222             France (TW)
   1              France A (AU)
   1              France BA (AU)
```

FIG. 2: *The inverted file structure*

he wants to see all terms in the index file or just those corresponding to one data field, for example all author terms or all title-word terms and he can browse through the index file as needed.

A further feature of ELHILL is the 'STRINGSEARCH' capability which enables users to search in a serial fashion for any data element in the full record. This means that if the BLAISE index does not contain a data element, users can search for these items if absolutely necessary. This technique is valuable if a user has already retrieved a set of about one hundred references using the normal index terms, he can refine his search economically through the 'STRINGSEARCH' facility to select a sub-set containing a specific sequence of characters such as a phrase or publisher's imprint.

Apart from on-line output, there will be a variety of options for off-line output of records. These include the normal off-line print facilities as well as the off-line search capability in ELHILL, so that users can select records and carry out off-line searching overnight when it is cheaper. Document requests will be put through to the British Library Lending Division. Having retrieved the records the user will request the item as a loan or photocopy and will be asked for a BLLD request form number. The bibliographic information will be transmitted to Boston Spa and automatically converted into a format suitable for BLLD to process. This will save the user from writing out the request and will reduce manual bibliographic checking, as well as helping document requests reach BLLD more quickly.

There will be a **transmit facility** in BLAISE which will enable users to have their output put onto a file in the computer and later have it sent as a stream of data for use in their own local library housekeeping system. An alternative to this is magnetic tape output from BLAISE which will also provide records in the physical format of the MARC exchange records. Finally, users who have retrieved records will be able to send them direct to the LOCAS system.

The edit software is being written specifically for BLAISE and will be integrated with the retrieval software so that users will be able to move easily from the retrieval sub-system to the edit sub-system and back again. When the user has found some references in the system that he desires to use for creating his own catalogue or for another local activity, he can have the relevant records transferred to the edit sub-system. The records will be copied onto an on-line transient file and will be held in that file for the user to manipulate as he wants. Thus, effectively, the records will be the user's and his alone.

When he has finished manipulating the data in the records, the user will be able to have them output by way of an off-line transient file through the various off-line output facilities mentioned above. He will also be able to have them displayed or printed using his own terminal in on-line mode.

One of the features to be incorporated in the system is a **filter or screening device** which can be specified by the user. Whereas the records taken from the retrieval sub-system will be full MARC records, records taken into the edit sub-system will be automatically stripped of the fields which the user does not want, so that he will be able to have transmitted to the edit sub-system the exact form of the record to meet his own cataloguing requirements. Users can use this device to create mini-MARC records containing selected fields for output from the system. The user will obtain access to individual records in the subfiles either through a system-generated BLAISE number which is a unique record identifier within the system or through use of positioning commands; or by working serially through the file to find the record he wants. When he locates the record he will be able to amend individual fields in the MARC record, using very simple edit commands. The display will show a field code with a print qualifier. For example, the first line of the author field will have a field code 'AA1', the tag information and the data itself. In this way the user can alter the tag number as well as the data. New records can be created in a very similar fashion and a variety of aids, including prompt commands, will be provided. The prompts can be specified by the user in his profile. There will also be macro commands which will enable users to store routine editing commands and recall them.

The edit sub-system has a command which will enable users to copy a record from any sub-file onto any other sub-file including within the same sub-file. This will help users wishing to exchange records or wanting two copies of a record so that they can create two similar records. Users can keep their records in the on-line transient file for as long as they please but the cost of holding records for more than one month will deter them. This facility will be useful for users wishing to hold a record until it has been checked.

The user can despatch information from the file by one or more output options, so that he can ask for an off-line print for checking and subsequently have the data output on magnetic tape or transferred to LOCAS as required.

The MARC update facility enables BLAISE to capture all new records created by users and to make them available for other users. Each night all the new records will be trapped and data from the records will be inverted to form an index file so that the records can be searched in the normal way. Any new record that is created by any user and donated to the system, will be available for all users within 24 hours of the record being input. In due course, these extra-MARC records will be passed through a checking process, to ensure the presence of a minimum set of fields and merged from a temporary MARC file onto the master or shared catalogue file. Updating of the master file will be carried out so that the UK MARC records supersede any other records for the same item, for example CIP data will automatically be replaced by the full MARC record when this becomes available. If a record has been created by a BLAISE user, that record may be superseded by the UK MARC record later on. The status of all the records on the system will be given clearly so that the user can decide whether or not to use the record as a basis for cataloguing or other purposes. Local MARC data specific to an individual library (stored in data fields with tag ending in '9' or between '950' and '999'), will not be stored in the master file, but will be kept in the on-line transient file, so long as the user wants it there and it will be available in LOCAS or on any of the output media generated from the on-line transient file.

BLAISE will hold details of every user of the cataloguing facility and will amend the holdings information for each record appropriately. This information may assist users for book acquisition, ordering and inter-library loan. Users can see whether another library in their vicinity has processed the same book or not. Holdings information in BLAISE will initially be rudimentary in form and duplicate copies of items held will not be shown.

The BLAISE system is comprehensive in its scope. The components are linked so as to give users a range of facilities which they can combine as they wish. The Library has designed BLAISE in this way to enable it to provide for a variety of on-line and off-line library and information retrieval activities and monitor the results for planning for future services.

APPENDIX 1

Proposed access points for searching the MARC fields

Concept	*Searching*	*Corresponding MARC fields*
Control Numbers	Record control number, incl. ISBN	001
	LC Card number	010
	ISBN entered by LC	020
	BNB number	015
	Alternative ISBNs	021
	ISSN	022
	BLAISE number	024
Authors	Entered as surname and initials in form 'OTHER AN'	100 400 600 700 800 900
Corporate authors	Searched for (a) as they are in AACR (b) as individual significant words	110 410 610 710 810 910
Conference names	Searched for (a) as the AACR entry (b) as individual significant words	111 411 611 711 811 911
Titles series titles	Searched as individual significant words	240 640 241 645 245 745 440 840 490 945
Subject searching UDC	Searched (a) using whole UDC classification code (b) parts delinited by colons (c) codes starting with the same stem (truncation)	080
DC	Searched (a) using the whole DC classification code (b) codes starting with the same stem (truncation)	082

Concept	*Searching*	*Corresponding MARC field*
Imprint	Publisher's name searched for as individual words	260 $b
Subject		
PRECIS	Searched (a) as individual significant word (b) PRECIS subfields with the exception of those subfields which are single non-significant words, e.g. 'with'.	690
LC subject headings, topical	Searched (a) as individual significant words (b) as phrases (if applicable)	650
Geographical	Searched as the heading stands on the record	651
Information codes	Language, entered as the standard 3 character abbreviation	008 $1
	Date 1 and Date 2	008 $a
	Conference Proceedings Indicator	008 $f
	Periodical Indicator	008 $m
	Government Publication Indicator	008 $e
	Country of Publication	008 $b
	Date entered on file	008

Information for Parliament

J. B. Poole and Angela M. Gould
House of Commons Library

Paper presented at an Aslib Evening meeting 22nd February 1977

1. Attitudes (J. B. Poole)

OUR JOINT THEME is information for Parliament and you will be getting two papers for the price of one—which must be some sort of a bargain in these inflationary times. Our hope is that our separate contributions will complement each other to give the evening some completeness it might otherwise lack. I say only 'some completeness' because we in the Commons Library are all too aware that our part in the job of providing information for Parliament is but one part of a complex system.

In the language of cybernetics, the two Houses of Parliament compose the black box. The outputs are diverse—the conspicuous ones are Parliamentary debates and questions, legislation and Select Committee evidence and reports; they also include radio and television broadcasts by MPs and letters and articles in the press. We should also mention here the attendance of Members at such international bodies as the Council of Europe and the North Atlantic Assembly. Less conspicuously the outputs include the work that Members do in their constituencies; in party and inter-party study groups on such subjects as diverse as the chemical industry, animal welfare and waterways and finally in private negotiations with ministers and their departments.

What now are the inputs into the parliamentary black box? They include all the products of the media—the press, radio and television; Members' contacts with people either individually or collectively; the effusions of pressure groups; statements of policy and intent coming from party organizations such as manifestoes; the Queen's Speech on the opening of Parliament—which is also a declaration of intent, ministerial statements and White Papers. Finally there is that sizeable, captive input, the Commons Library.

If now we try to evaluate the parliamentary library service when it is seen in this setting how important are we to rate it? In their valuable study of '*The Member of Parliament and His Information*', Barker and Rush concluded that, as they put it, 'At the present stage of the House's affairs . . . the term 'parliamentary information services' is 95 per cent synonymous with the work of the Library.'[1]

This is a flatteringly high statistic, but the two authors do not make it entirely clear how they arrive at it, nor do they attempt to quantify the importance of parliamentary information services in the totality of all the other types of information service flowing endlessly into Parliament. In any case, such an attempt, I am sure, would be doomed to failure even if it was thought worth mounting. Thus the total picture is confusing and one of the best summations of how confusing it can be was written by John Adams, second president of the United States:

Aslib Proceedings, 29 (6) June 1977, p. 221–236. Printed in Great Britain

> 'An assembly must be informed before it can act. The understanding and conscience of every member should be clearly satisfied before he can vote. Information is to be had only by debate, and examination of evidence. Any man may see that this must be attended with difficulty; but no man, who has not seen the inside of such an assembly, can conceive the confusion, uncertainty, and procrastination of such proceedings.'[2]

(I sometimes think that, in those few words, Adams has said it all, and much more succinctly and elegantly than any of his latterday followers have managed to do.)

He stresses the need for parliamentarians to be *informed* and he indicates two key ways in which they become so. He shows that before a parliamentarian acts in his constitutional role he needs to be *intellectually* persuaded of the rightness of his actions, but he also needs to be *morally* convinced. And I think that it may be this last element, involving a Member's conscience, that distinguishes information work in the parliamentary context from that performed elsewhere. I shall return to this aspect later since a man's moral conviction is clearly closely allied to his political conviction and this simple change of words introduces a hazardous new element into the discussion.

Let us look briefly at the present structure of the Library. I shall omit from the discussion what are conventionally called library services—not because I consider them unimportant but because my colleague Angela Gould will be dealing with them; indeed, if there is a critical area in the Library's functioning it is probably here where it lies.

I shall concern myself with the six specialist groups supplying research assistance to Members. These groups, in the order of their creation, deal with:

- home and parliamentary affairs
- statistics
- international affairs
- science and technology
- economic affairs

and
- education and social services.

Thirty years separate the first of these from the last, but the last three have been set up in the last decade. One can foresee the creation of further groups in the future; some of them might be energy, defence and a number of regional splits within the international affairs section.

The make up of these six groups is similar, with a mixture of graduate researchers—an increasing number of them as the years go by with postgraduate experience or training—professionally qualified executive staff and clerical support.

Now one of the most gratifying things for us in the Library has been to read the good opinions of us expressed by those Members who gave evidence to the Select Committee on Assistance to Private Members, chaired by Mr van Straubenzee, which reported in October 1975. This makes a striking contrast with the views that Mr (as he then was) Richard Marsh expressed in a debate in the Commons in August 1963. He said:

> 'Any Member of Parliament who finds the Library adequate cannot be doing a proper job. It is a very brilliant Member of Parliament who, without any previous experience or training, can take on any Minister, with all the help and advice of the civil servants behind him, by popping into his local library or the Library of the House and looking up a few books.

> Research is an important and skilled job, and a large section of the membership of this House is incapable of doing it.... There is no one in this House to whom one can go to obtain information or a brief on particular subjects. This facility is not a trimming. It is part of the tools of trade of Members of Parliament. This House can do as good a job as any other elected body if it has the facilities'.[3]

Harsh words, but I hope to show that things have improved since then—13 years not wholly wasted.

A striking feature of the last few years has been the increasing specialization of our researchers. There are great advantages in this from the point of view of giving Members a more useful service. But there are disadvantages too and my own view would be that, at the moment, we are in a rather precarious situation: for the most part each research niche is occupied by one researcher, with little scope for backing up, let alone doubling up. By developing our own expertise, which may be considered the natural progression for any special library, we run a concurrent risk of rendering ourselves overly vulnerable to the consequences of staff absences or movements.

This same factor—though obviously not seen from the same vantage point—was brought out in evidence submitted to the van Straubenzee Committee. Thus one Member wrote:

> 'It has long struck me that in the Research Division [of the Library] small groups of people and sometimes even individuals carry a range of subjects that makes a farcical contrast with the fine subdivision of responsibilities that we see in Government departments. The backbencher will remain at a disadvantage *vis-à-vis* the Government for as long as we acquiesce in this imbalance.'[4]

We must now spend a moment on the disputed matter of what constitutes 'research' in a parliamentary sense. As one of my colleagues pointed out in an article written some time ago, 'Generally speaking, it does not imply original long-term research in the academic sense of the word'.[5] I think all of us would accept that. But to extrapolate from that, that what we do has no value—as some academics undoubtedly feel, though perhaps they are rather more circumspect about actually saying it—is to miss the point about what we actually do and what our customers really want. If a Member wants to swat a Minister's bland reply to a parliamentary question stone dead with a killing supplementary in a quarter of an hour's time it is no use promising him an interim paper six months from now.

Such a situation as I have just outlined may be relatively uncommon but it is by no means unknown. Under such circumstances one would hardly expect to find the Commons Research Division showing quite the same standards of academic excellence that one would usually associate with university research.

Barker and Rush, whose work I have referred to already, define parliamentary research, not according to some set of criteria determined by those who, for the most part, have never done any, but by what one may call the slant imparted to it. Thus they said (referring to the mid-1960s):

> 'The distinction to be drawn is not that between the somewhat miscellaneous reference function of the small Library organisation which has so far developed [in the Commons], and the highly specialised long-term work of university scholarship, but rather between the reference function for politicians and the analysis, or genuine research, function for politicians.'[6]

Now this is not a novel distinction. Some years ago an enquiry into the Commons Library by the Estimates Committee raised this same distinction; the Committee recommended that:

> '. . . the House should decide whether it requires a research service, in addition to an ordinary reference library. It would then be necessary to decide whether such a research service should provide information only at the request of Members, whether it should prepare spontaneously background material and bibliographies on subjects likely to be debated in the House, and how far it should go in interpreting facts and figures for Members.'[7]

In fact, as events have fallen out, the House has left the Library pretty well alone in developing its services as it has seen fit. It has, in other words, given the Library a large measure of autonomy. But the unexpressed suspicion implied in the Estimates Committee report was that, by allowing the Library to develop autonomously, there would be a concurrent risk that the autonomy of the private Member would be lessened.

This fear is not infrequently expressed by Members. Writing of the role of experts in the servicing of select Committees Mr Ian Mikardo has said:

> 'I fear that, if the committees were to build up large, subject-expert staffs, their authority would be weakened, not strengthened. There would be a real danger of their simply rubber-stamping reports drawn up by their expert advisers.'[8]

This is, in essence, another form of the dilemma of those who are in receipt of advice from others. The question of whether the advisers shall be 'on tap' or 'on top'. I shall return to this point in my conclusion.

Barker and Rush published their book in 1970 but it was based, for the most part, on field work carried out a few years earlier. Much has happened since then. Thus these authors were much taken with the personal research assistant idea as one solution to many of the private Member's difficulties.

Before we look at research assistants more closely, let me spend a moment describing the impact they have made on the Library. One striking feature about them is the rapid growth in their numbers that has occurred. In 1967 there were probably only about 6 or 7 research assistants. By 1973 the number was about 50 and now the total is perhaps as high as 180.

Research assistants impinge on the Library in two ways. They are physically present: not a very startling observation, but those of you who have been in the Commons Library will know that space is not so abundant that a few extra bodies around will go unnoticed. Because of this, access to the Library has been severely restricted for research assistants. This is an understandable source of annoyance to them which is not entirely mitigated by the fact that the researchers have unlimited access to the Library annex in the Norman Shaw North Building. Next the researchers are present as generators of work for the Library, if only as intermediaries for their masters. The point of concern here is the extent to which a researcher might reasonably be expected to be self-servicing and that to which he or she might justifiably call on the Library for help. Lest this seems to you to show a lack of co-operation on our part, let me point out to you the underlying worry that the appearance of research assistants in substantial numbers had weakened the much valued links between the Library and private Members. It may well be that these contacts are now little more than a cosy survival from a more leisured time and that eventually our major links with

Members will be telephonic, as they largely are now in Washington. Certainly the hiving off of a major part of the Library to the Norman Shaw North Building that I mentioned earlier could be seen as a step in this direction.

One reason why Barker and Rush—to return to them—advocated a greater use by Members of research assistants was the willingness of the private researcher to carry out politically biased work that the Library would not do. This point is brought out in the submission of the Study of Parliament Group to the van Straubenzee Committee where the Group said that:

> 'Our view is that a research assistant who is in political sympathy with the Member he is working for can provide a dimension of assistance which the Library cannot.'[9]

The Committee itself in its report took this point, although it expressed some uncertainty about what research assistants actually did. The Committee said:

> 'About the precise functions of a Member's personal research assistants it is more difficult to be specific. Clearly they perform a different range of duties from those carried out by the staff in the Library. They are able to inject a political dimension into their work which the staff of the Library serving Members of all parties cannot and would not wish to provide.'[10]

Now doubts about the role of research assistants have been expressed that are the exact analogy to the remark by Mr Mikardo that I quoted a moment ago. Thus one Member has said about them:

> 'One would be delegating judgement as well as the search for information.'[11]

Such fears are not unique to this country. We are accustomed to think that most things must be better organized in the United States than they are here. Parliamentary support services are a case in point. The Congressional Research Service in Washington is probably an order of magnitude bigger than we are and much the same relation probably exists between the staffs of committees and of private Members in the two countries. But are such large numbers of acolytes and placemen a good thing? Norman Meller, of the University of Hawaii, detects a risk that 'The indiscriminate augmentation of personal staff could well lead to the institutionalizing of the legislator, and eventually to each legislator becoming the captive of his own staff.'[12]

I am not sure how one could tell when such a situation had been reached. My own guess would be that no private Member in this country has yet appointed so many people to his or her own staff that the risk is anything less than remote. In the evidence given by Members to the van Straubenzee committee not everyone was keen to have a private researcher, but the non-placets generally objected on other grounds than the risk that the researchers might take over the Member.

But whether there is substance in Meller's fear or not, we in the Library can do nothing about it. We are fully occupied in ensuring that our *own* working relationship with Members is effective and unambiguous. And here I would like to quote again from Meller since I think he has summed up precisely the motivation of those of us who have chosen to work in and for Parliament. (Perhaps first a parenthetical word about Norman Meller: although he is now a fully paid-up academic political scientist, he first did time in the California State legislature as a researcher and he has since advised a number of newly independent countries in the Pacific in the setting up of their own parliamentary research services.) So to quote from Meller:

> 'A deep-rooted ambivalence is inherent in legislative reference work: on the one hand there is the researcher's desire to be in the center of action, a participant in the play of power which he senses all around him; and on the other, there is the wish to remain aloof and work detachedly and with balanced perspective, avoiding identification as a Member's or [a] committee's man.'[13]

So how can we best distinguish between the work that personal research assistants do for Members from that which the Library carries out?

We must assume that research assistants have a close personal interest both in their own Member's work and in politics generally. They are political animals and few, I imagine, would quarrel with that assessment. But what of the Library? I well recall when a former colleague left us to move across the road into Whitehall. For her new job she needed security clearance and a former military gent bearing a distinct resemblence to Ernest the Policeman was sent across to us to check her out. At one point during his visit he casually said, 'I suppose she isn't interested in politics, is she?' That has always seemed to me a very curious question. Why should it be expected, as he obviously did, that an interest in politics would detract from one's ability to do one's job or one's reliability in a setting like the Commons Library? My own view is that an *interest* in politics is well nigh essential if one is to function effectively and, indeed, happily. There must be some commitment to the purpose that Parliament serves. Because it is not like other places of work and it is naive to think of it in such terms.

Now to be interested in politics is not the same as being an unacknowledged subversive of the left, right or centre. What I would consider reprehensible would be a situation in which a colleague's views were to him, or her, so compelling that he was unable to prevent them from obtruding into his work for a Member or a Committee. I should add that in my decade in the Library I have never known of this happening.

But there are other ways of being subversive apart from the political. They tend not to rate so highly in the opinions of those who worry about these things, but I wonder if they are not potentially more inimical to one's work than strongly held political views. What I have in mind are the views of pressure groups. I do not intend at this point to go off on a tangent and try to cover the range of activities that these groups concern themselves with. You will all be familiar with some of them and, for all I know, some of you may be active members of them: wanting to put things in our water, or to take things out; wanting to make expensive aircraft, or to stop others making or flying them; trying to promote or prevent the practice of abortion.

But a large number of these groups are constantly seeking to have their voice heard at Parliament. They are, collectively, a major input into the black box at Westminster that we discussed at the outset. From our point of view they can be a valuable source of non-official, or what we might call counter-information. Now it has been held in the past, as must have been evident from the extract I quoted from the Estimates Committee report, that a reference function alone was an adequate one for the Commons Library to perform: that it was not necessary to try to go beyond the official pronouncement, of whatever sort it was. To this view I cannot do better than give you Bernard Crick's gentle rebuttal:

> 'It does not impugn the honesty of civil servants to say that *all* factual information is inherently selective and is assembled in the light of certain prior purposes. . . .'[14]

Thus pressure groups can greatly help us in the Library to supply Members with at least a rounded-out, if not full reply.

But if there is one thing pressure groups are not—otherwise they would be failing in their self-appointed task—it is that they are not unbiased. And herein lies a danger for us. Because issues are never pure and rarely simple the evaluation of the contributing information and data is a complex task which we in the Library are not always fitted to do, either because we are too thin on the ground or because we simply lack the necessary specialist background. In such cases a pressure group can seem to offer a sort of deliverance from the thraldom of complexity and ignorance by its tendency to simplify the issues. To be seduced by this appeal I would consider a risk comparable with overt espousal of a particular political viewpoint.

A case in point is the emotive issue of fluoridation. I think one would be hard put to it to find another issue upon which the Government's point of view—irrespective of the complexion of the governing party—had been so consistent over so long a period. Nevertheless many people, some of them Members of Parliament, are worried by the practice and accordingly oppose it. Now the pro-group, those in favour of fluoridation, tend to be less committed and less vocal about it than those who are anti and among these is a particularly active pressure group. Because of this imbalance it is easy to be persuaded that those who make the more noise are necessarily in the right. Add to this the difficulty that I think anyone not professionally concerned would experience in interpreting the data and I think you can see the point I am trying to make.

This has been a very partial view of my share of our theme of *Information for Parliament*. There are many aspects that I have left out. Thus I have not dealt in any depth with the sort of people we look for to work in the Library and I have not dealt specifically with work for Committees rather than work for individual Members. I have not even mentioned either the House of Lords or the European Parliament and the problems of servicing them. Finally, in this catalogue of omissions, I have not mentioned how we might be affected by the devolved Assemblies if and when they are set up.

I want to end my paper by trying to see where the Commons Library might go—in a non-mechanical sense.

Now it has been urged by some writers—Bernard Crick is one of them—that the Library should be consciously developed into something like a 'counter-bureaucracy'. Crick has used the expression 'a Parliamentary workshop of research and investigation'; in part this would complement Whitehall and in part it would break new ground in order to obtain information for Parliament.[15] This is to suggest that the Library should become both a much bigger and more activist outfit than has been the case hitherto. The proposal that it should be bigger has found a welcome support in the van Straubenzee Committee report, but we have never sought to take on the trappings of what Alan Watkins has called 'a department of the opposition'. My own view is that for us to so identify ourselves would be to make ourselves liable to a change of partisanship and, in consequence, to make us vulnerable. Indeed such evidence as exists, suggests that Members themselves would not welcome such a change in the approach of their Library to the information problem. We may try to supply some cues and prompts to the Parliamentary actors, but we should be wary of trying to become the stage manager.

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2. Techniques (Angela M. Gould)

It is my intention to consider how we might expect the future provision of information for Parliament to be influenced by computer technology. Computers have already made a significant impact on the practice of libraries and information services and the changes which they have brought about will no doubt continue and increase. Parliament is no less an object of this change, even if it has been a little cautious to embrace it enthusiastically. The range of computer techniques which are possible candidates for use in Parliament are those which have already been introduced, or are being considered, in many libraries and information services, but the potential opportunities and the problems which they present possess some slightly unusual features.

Over a period of some years Parliament has been the subject of the attentions of various computer companies and of other organizations who have been anxious to promote specific computer systems. A series of demonstrations and experiments mounted by these organizations and the experience of parliaments in Europe and America, have been of value in helping Parliament to assess which applications are likely to offer the greatest benefit.

The parliamentary climate, economic conditions apart, is now more sympathetic to the use of computers than it has ever been in the past. In the summer of

1976 an Informal Joint Committee, with Members from both Houses, was set up to study the future use of computers in Parliament. The Committee stated in their recommendations that:

> 'We consider that it is essential that Parliament should embrace computer techniques in order to enable Members and officials of both Houses to operate as efficiently as possible and cope with the quantity of information which Parliament requires to carry out its legislative and other functions.'[1]

The Committee surveyed possible applications, a large proportion of which were directed towards the satisfaction of Members' information needs. In a short paper it is only possible to consider a few, the most obvious perhaps—bibliographic reference retrieval, full-text searching, retrieval and manipulation of numerical data and text processing and to comment on each in a very superficial manner.

Bibliographic Reference Retrieval

a. The House of Commons Library

Much of the work carried out in the House of Commons Library involves the use of a range of custom-built indexes. In view of their considerable importance these indexes are the Library's first priority for computerization and it is on this, the bibliographic reference retrieval application, which I will comment first.

It would be inappropriate at this point for me to present a detailed description of a computer-based indexing system for Parliament, but it would be relevant to point out certain features of the present manual system which recommend its mechanization, or make slightly unusual requirements of a computer-based system.

Over a period of twenty years the Library has developed a large-scale indexing operation and the number of items indexed each year is now approaching 100,000. I hasten to add, however, that the Library has too few staff to abstract this material, or to index it to the depth appropriate to the increasing level of specialization in the Library. It is to be expected that the volume of material to be indexed will grow and, as the existing manual operation is strained, the Library is concerned how it will cope in the future.

Another aspect of the size of the operation is the need for multiple copies of the indexes. This is a requirement imposed by the severe accommodation problems of a parliamentary building designed in the nineteenth century for the more leisurely execution of parliamentary business. Library staff, who are dispersed through the Palace of Westminster and other buildings, need ready access to the Library's indexes, but this is difficult to provide by means of a manual operation which is already pushed to its capacity. The size of the indexing operation alone commends mechanization.

Additional pressure is placed on the operation by the high standard of accuracy set by the Library for its indexes. Members, whose points of view are constantly under attack, need to be secure in the knowledge that the facts they present are accurate and right up to date. The provision of outdated information by the Library would quickly lead to the embarrassment of both the Member and the Library and, consequently, daily updating of the indexes is essential.

The production in printed form of the daily updated indexes of the size indicated for use in multiple locations is an unattractive proposition. On-line working would be a neater, more favourable solution, but even this would present its problems in the parliamentary environment. Through its late and unpredictable sittings, Parliament imposes unconventional working hours on its information services. The Library is always open when the House is sitting and the indexes must be available for consultation at any time that it is open. Thus an on-line retrieval system would have to be available for use not only all day and all evening, but frequently for much of the night. A computer service is more costly to run under such demanding and unpredictable conditions.

A feature of the Library's indexes which is probably encountered in few other library environments is the emphasis on the record of events. An enquirer will often wish to know whether a parliamentary event has, or has not, taken place but will have no need to consult the record of proceedings. The index which charts the passage of bills is frequently used for this purpose. It is organized on a bibliographic basis, because a document, be it a bill, committee report, debate in Hansard or formal record of proceedings is associated with every stage in the legislative process. In all the Library's indexes references are displayed in chronological order by subject, or in the latter case by the title of the bill and hence the sequence of legislative stages is accurately reflected. The display of references in their correct chronological sequence must be an essential feature of any indexing system which the Library uses.

Finally, as the effectiveness of any indexing system rests on the quality of indexing, a short comment at least should be made on the indexing vocabulary.

As Parliament takes an active interest in more and more aspects of life the range of subjects covered by the Library broadens. This together with the increasing level of specialization already noted is making demands on the existing indexing vocabulary, which has developed without co-ordination over many years. Unfortunately the limits of its flexibility to accommodate the appropriate level of specialization are now encountered with increasing frequency.

For these and other reasons the Library has reached the conclusion that the present manual indexing operation will be unable in the future to meet the demands made on it and that the only satisfactory solution would be a change to a computer-based system. In 1970 members of the Aslib Research Department made a detailed study of the Library[2] and made proposals for the computerization of the indexing operation. At the time the funds were not available to implement the proposals and now after seven years the need is very much greater. During this period of delay more advanced techniques, such as on-line working, have become available and by incorporating them in our updated proposals at least a more useful system can be attained. The Library is at present seeking the approval of the House for the implementation of its proposals; as ever, in an unfavourable economic climate.

Parliamentary questions have been chosen, by reason of their important information content, to be the first items indexed for the proposed computer system. It is interesting to note that although the House of Commons Library came to this decision quite independently, both the Bundestag and French

National Assembly have chosen parliamentary questions as one of the first classes of material to include in their computer-based retrieval systems.

b. The House of Lords

Whilst the House of Commons Library has been formulating its plans, the House of Lords has made virtue of necessity by the introduction of a computer system for the retrieval of the working papers of the European Communities. When the United Kingdom joined the EEC, Parliament was faced with the flood of papers from Brussels, Strasbourg and Luxembourg, for the storage and retrieval of which it had made no prior plans. The House of Commons Library absorbed much of this material into its existing indexing system. The House of Lords, on the other hand, had no such accommodating operation, but overcame the problem by using the IBM on-line retrieval system, STAIRS, on the GLC's computer to record and retrieve these papers. A number of visual display units are provided throughout the Palace of Westminster for access to the system, including one in the Commons Library.

The history and current state of progress of draft legislation in its passage through the institutions of the European Communities can be deduced from the references retrieved. This is only part of the process from the point of view of our Parliament and in order to enable the user to follow the progress through still further, the documents relating to the consideration of proposed community legislation in both the House of Lords and the House of Commons will soon be added to the database.

Although the STAIRS system can be used for full-text retrieval, in this case retrieval is based on title words taken from the cover or contents pages of the documents. Retrieval problems are created by the reliance on the titles and official numbering of proposals, which both have a tendency to change as the proposals are passed from one of the Communities' institutions to another.

The contents pages do not necessarily contain all relevant information from the official journals etc. and the random order of references retrieved causes some irritation when tracing the consecutive stages of a proposal, but broadly speaking the system is effective.

A co-ordinate approach for Parliament

I have described the project underway in the House of Lords and the plans of the Commons Library. As the two are very similar in their basic objectives it would be surprising if no one questioned why the two Houses do not co-operate in the use of the same computer system. The traditional autonomy of the two Houses makes this difficult to achieve, but encouragement can be taken from the success in France, Germany and Italy of establishing a single data processing centre for both their chambers and from the strong recommendations of the Informal Joint Committee for the co-ordination of the activities of our two Houses, which recommended that:

> 'Co-ordination between the two Houses at the levels of both Members and officials is essential. Any system developed should be regarded as providing a service for Parliament not for one House or one office.'

There is much to be learnt from the experience of the United States Congress and Senate, who over a number of years developed completely separate retrieval systems and only recently have achieved a measure of co-ordination in the operation of one retrieval tool, their Bill Status System.

Use of external bibliographic retrieval services

With its wide range of interests Parliament cannot assume a parochial attitude towards use of information sources and the recent increased ease of access to commercial on-line systems and the promises of EURONET have been followed with interest. The breadth of subject coverage, level of specialization of Parliament's interests and the lack of funds to subscribe to many abstracting and indexing services suggest that on-line services, which offer many databases, would be very useful. Experience will show whether this is so, but it would appear that at this stage the databases currently available on-line, or projected for EURONET would be suited to the parliamentary interest to only a limited extent.

The databases currently available are predominantly scientific and technical and although Parliament by no means ignores this aspect of life, it lays a different emphasis on it. For example, Parliament is generally not concerned with medical research into a particular illness or handicap, but with the compensation, or facilities for the care of those who suffer from it. Even in the databases with a less scientific content the emphasis tends to be towards research rather than practice.

It cannot be assumed that Parliament is completely alone in finding its interests matched directly by only a few of the databases available. Its interests are, on the whole, in line with those of government departments and a look at the database created by the GLC Research Library reveals a considerable degree of common interest with local authorities. It is encouraging that one of the aims of the next three-year action plan for EURONET is to encourage the promotion of databases over a broader subject range.

It is, perhaps, significant that the two external on-line services to which the United States Congressional Research Service first subscribed were not those which offer a range of scientific and technical databases, but the New York Times Information Bank (a newspaper and magazine cuttings service) and JURIS (a legal retrieval system).

Full-text retrieval

Legislation

As in the United States the availability of information about the law is of great importance to our legislative body. Both in this country and abroad much effort has been expended on the development of full-text retrieval from legal texts, both legislation and civil and penal law cases. Of these texts it is the legislation which is of primary interest to Parliament.

There have been two opportunities for the House of Commons to sample the possibilities of this technique. The first, in 1973, was a demonstration of the STAIRS system and the second, in 1974, was experimental use of the STATUS system. The STAIRS demonstration made use of the agriculture and compulsory aquisition statutes, which at the time were the only group of statutes converted by HMSO to machine-readable form. The STATUS system was demonstrated with, amongst other material, the primary legislation relating to atomic energy and an intriguing file of Road Acts of George III. As with all experiments the databases were limited in their coverage and it was unfortunately not possible to obtain a realistic feel for the potential usefulness of the systems for parliamentary enquiries.

It is easy to see the attraction for lawyers of these full-text retrieval systems. Very few of the Library staff, however, have a legal training and whilst they try to guide Members through the legislation on a particular topic, they do not purport to be capable of interpreting the law. Many Members, for their part, generally require a digest of the law on a particular subject, which is often readily available in *Halsbury's Laws*. A full-text retrieval system, without special refinements, would produce all occurrences within the statute book of specified words or their synonyms. This then leaves the user with the arduous task of collating and analysing the material himself. It may be that the layman has neither the need nor the legal know-how to make worthwhile use of the technique, but that lawyers will be able to use it to very good effect.

However, there is one feature of full-text retrieval from statute law which could prove useful to both lawyer and layman alike. This is the way in which amendments to, or repeals of, clauses or sections of a specified act can be traced through the occurrence of the title of the act in the schedules of subsequent legislation. This could provide an alternative to the necessary but time-consuming activity of manually updating a set of statutes. The Library, and no doubt other organizations, would be relieved not to have to undertake this task.

In a similar way the use of the technique could be extended to statutory instruments, because through the mention of the empowering act in the instruments, the set of instruments relating to the act could be retrieved. Tracing statutory instruments is awkward and it is to be hoped that secondary legislation will be considered an essential aspect of legislative full-text retrieval systems.

Not all legislative retrieval systems rely on the occurrence of titles of acts in subsequent statutes to link related legislation, for example the CELEX system for European Community law, which is operated by the Commission in Brussels.[3] Although this is basically a full-text retrieval system (STAIRS), the new legislation is carefully analysed before input, any links with existing legislation are specifically recorded and an appropriate reference is added to the existing records. The system has much to offer as a service to the member countries of the Communities. The least of the problems still to be overcome is that of language and it will be some years yet before it will be possible to interrogate the system in the languages of all member countries. The difficult task of incorporating references to the impact of community legislation on national legislation has still to be accomplished and in view of the variety of legislative procedures employed by member countries, this will not be easily achieved.

Hansard

On a number of occasions full-text retrieval from *Hansard* has been suggested.

As text it is very different from legislation. The text of legislation is format, there is no redundancy of text and the careful choice of words tends to reduce the retrieval problems created by synonyms and quasi-synonyms. *Hansard,* on the other hand, is a largely verbatim report, the language is informal and the information content of debates is low in proportion to their length. The content of a debate is often repetitive for the sake of emphasis and the many shades of opinion expressed, when reduced to single words or phrases for retrieval purposes, also appear merely repetitive. For these reasons one is led to question whether there is much advantage to be gained from storing *Hansard* for on-line retrieval, at a rate of approaching one million characters per day, in order to retrieve multiple references to the same debates. Only when there has been opportunity to experiment on a large scale will the answer to this question be found.

In looking to other countries for their method of retrieval from debates the picture varies with their methods of executing parliamentary business. In the USA the debate on the floor of the House does not figure prominantly and no attempt is being made to use the text of debates for full-text retrieval. In Germany it is the intention to analyse and index the debates intellectually. The French are intending to retrieve from full-text, but it should be pointed out that it is not the full-text of the verbatim report which will be used but the summaries which are compiled daily. The problems, which I have outlined will not, therefore, be encountered to quite the same extent.

The other substantial part of *Hansard*, parliamentary questions, presents a different picture. There is greater formality in the questions and their answers than there is in debates. Members are given guidance in formulating their questions and they are required to be concise. Similarly, the answers, which are drafted by civil servants, are formal and concise. Only in the supplementaries to oral questions does the informality return.

An experiment carried out during 1973 using the STAIRS system gave encouragement to the view that parliamentary questions are promising candidates for full-text retrieval,[4] but at the present time the cost of converting the questions, let alone debates, to machine-readable form prohibits their use in an operational system. HMSO hope to be producing *Hansard* by computer-typesetting techniques in 1979 and so it should be possible to use the machine-readable text produced in the not too distant future.

Statistical data

The third of the applications which I would like to touch on briefly deals with not textual but numerical data. In 1973 ICL mounted a demonstration in the House of Commons of the MEDHOC system for the on-line retrieval of series of statistics from the Central Statistical Office's own machine-readable data-base.[5] Use of the system was easy to master and Members were impressed by it, despite the fact that there was no facility to manipulate the data and the database was necessarily limited in its scope.

There is a feeling amongst Members that they should have access to any public information held by any government department and that they should be in exactly the same position as Ministers to obtain and use this information.

Parliamentary questions already act to an extent as a channel for this information and the Library holds a great range of published sources including those of the Central Statistical Office. The important question to be asked is whether great stores of statistical information do in fact exist in machine-readable form and whether it is feasible to gain on-line access to them. A study undertaken in the United States in 1973 of the actuality of the masses of machine-readable data of interest to Congress proved otherwise. Even allowing for the passage of four years since the study was undertaken the situation is unlikely to be so very different in this country now.

Much interest has been shown recently in economic modelling systems, but whilst anticipating the demand that some Members will make for access to them and the competence with which they will use them, the need and actual use which would be made by the majority of Members is doubtful. The problems are much the same as those for statistical data banks.

Text processing

My final comments relate to a source of information which is familiar to all Members. The Vote, which is a bundle of papers about the forthcoming business of the House, is received by every Member as a matter of course each day. Without this confusing set of papers the proceedings of the day would be even more incomprehensible. The papers include the agenda for the day, questions down for answer that day, outstanding business and the proposed amendments to bills and questions put down on the previous day. The collation, to a logical sequence, of the questions and amendments put down over a period of time is a complicated task, which causes officials to make intensive use of scissors and paste. This is work in which computer text processing techniques could give significant assistance.

In an experiment in the House of Lords in 1974 the collation of amendments to a bill were processed using the IBM text processing system ATMS. As part of the experiment the bill itself was also stored and amendments to it were incorporated as they were agreed. The potential of the technique was proved, although the standard package did not cope adequately with the somewhat unusual layout of bills and the sense of storing a bill in a computer and amending and reprinting from this master copy was demonstrated. The frequent redrafting and reprinting of a bill as a discussion document for government departments before it is presented to Parliament enforces the case for processing the text in this way. The direct use of a magnetic tape copy of the master for phototypesetting is then the logical conclusion.

Taking one step further back into the Office of Parliamentary Counsel where many bills are first drafted, the usefulness of another aspect of text processing systems can be appreciated. Not only can the draftsmen use the system to rearrange the clauses and to make frequent alterations without overwriting the copy to the extent that it needs frequent retyping but, if changes in terminology are called for, he can use the word retrieval facilities to retrieve all occurrences of a word in the bill and alter them. During the winter 1974–5 the Office of the Parliamentary Counsel experimented with the system and were enthusiastic about its possibilities.[6]

The use of a single computer system to assist the progress of a bill from its initial drafting, through preliminary consultations and redrafting and its passage through Parliament, to its final publication as a statute would be both logical and labour saving. It is to be hoped that the many and real difficulties it poses will not prevent the eventual achievement of this objective.

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Mushroom poisoning, thioctic acid and the foreign language barrier

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The neglect of foreign language material by English-speaking scientists may sometimes be just one aspect of a more general problem involving poor current awareness and failure to use available bibliographic tools. Evidence for this is provided by a study of the factors which have impeded the spread in North America of information on the use of thioctic acid to treat mushroom poisoning. This study also shows that published English language abstracts may be sufficient to overcome the language barrier without the need for full translations. Consequently, a general improvement in the coverage and use of the appropriate bibliographic tools, especially abstracting journals, should help to reduce the foreign language problem.

STUDIES OF THE FOREIGN language barrier in science and technology have indicated that scientists and technologists often do not know of and or do not use the facilities which already exist to help them to overcome the language barrier. In particular, Wood[1] and the Sheffield workers[2] found that few of the scientists they studied, tried to find English abstracts of foreign language papers, yet in an experiment, the British Library Lending Division found that the provision of English summaries satisfied about half of a sample of requests for full translations.[3]

As a means of overcoming the language barrier, abstracts offer major advantages compared to full translations as they are cheaper, easier and quicker to produce. Published abstracts are more likely to be available than full translations from translation pools and scientists (and librarians) are more likely to be familiar with (and therefore use) conventional abstracting journals than bibliographic tools specifically for translations, such as *Translations register-index*. Consequently, if there is evidence that abstracts can provide a satisfactory means of overcoming the language barrier, efforts should be made to encourage their use and improve their coverage. One such piece of evidence is the BLLD study. Another is the case history of thioctic acid treatment for mushroom poisoning in the US. Shephard[4] has shown how the language barrier seriously impeded the spread of information about this method of treatment in North America. Further investigation shows how useful abstracts could have been in this case and also suggests that the neglect of foreign language material by English-speaking scientists may sometimes be just one aspect of a more general problem involving poor current awareness and failure to use available bibliographic tools.

Case history of thioctic acid

The first known use of thioctic acid to treat poisoning by mushroom of the

Aslib Proceedings, 29 (6) June 1977, p. 237–240. Printed in Great Britain

Amanita type in North America was in 1970.[5] Thioctic acid had been in use in Europe for several years already and between 1958 and 1970 it was discussed in at least twenty-one papers and one book and a relevant reference was also listed in a bibliography on poisoning in childhood. Most of these were published in foreign languages; the few in English were published in journals which most North American physicians were not likely to use. Consequently, this form of treatment was unknown in North America and it was only by chance that Finestone, the physician treating the 1970 case, learned of it. Up to 1974 only one further original account of the clinical use of thioctic acid[6] was published in English and the climate of opinion among North American physicians remained cautious or sceptical. Medical reference books which mentioned it at all described it as only a possibly useful treatment,[7] while review papers published in research journals[8] generally took the attitude that firm evidence of its usefulness was lacking and that carefully controlled experimental investigation was still needed.

Availability of abstracts

At one time of Finestone's 1970 case, the language barrier could have been overcome by the available published abstracts though only with difficulty. *Excerpta medica* (Section 30 Pharmacology and toxicology and its predecessors) had up to that time published four relevant abstracts, not an impressive performance considering that at least twenty-one relevant papers were in existence. Moreover, of these four, one indicated that thioctic acid was of doubtful value, another did not deal with *Amanita* but with a different type of mushroom, one (which was of an English language paper) did not highlight thioctic acid, mentioning it only as one of several substances used to treat a case and one discussed the effectiveness of thioctic acid only as an antidote to phalloidin, which does not usually cause death and not the more toxic amanitin against which thioctic acid therapy is primarily directed.

Chemical abstracts had up to this time abstracted five relevant papers, of which two discussed only phalloidin. The other three discussed amanitin and the abstracts might have given a physician enough information for him to use this method of treatment without having to consult the original papers. However, physicians would be less likely to use *Chemical abstracts* than *Excerpta medica.*

At the time of the 1970 case then, relevant English language abstracts were available but they were few in number, several did not make it immediately obvious that thioctic acid therapy might be beneficial and the most useful abstracts were in an abstracting journal not likely to be searched by most physicians (*Chemical abstracts*).

Neglect of available bibliographic tools

The authors of the review papers subsequently published in research journals[8] faced only a slightly improved situation: only three further relevant foreign language papers were abstracted before 1974, two in *Chemical abstracts*, one in *Excerpta medica*. In addition, *Chemical abstracts* abstracted two more English language papers and *Excerpta medica* abstracted one. However, whereas a practising physician seeking information urgently needed to treat a case, might not be expected to conduct a comprehensive literature search using several bibliographic tools (although he might perhaps give the job to a librarian), one would expect the author of a review paper to do so. Moreover, unlike Finestone in 1970, the authors of the later review papers were aware of the possible utility of thioctic acid and did have reason to believe the foreign language literature might be a valuable source of information: they all mentioned the use of thioctic acid in Europe and cited some foreign language papers. They were also all familiar with Finestone's case, which first drew attention in North America to the European work. Nevertheless, they seem to have made no systematic attempt to gain access to the foreign language literature via the available published abstracts, since of the nine foreign language papers abstracted before 1974 only three were cited in these review papers.

The problem here seems more one of general current awareness and literature searching procedures rather than the foreign language barrier, since these authors also seem to be unfamiliar with several of the key relevant papers in English. There are three original case reports in English but one[9] is not cited in any of the review papers, another[6] is cited in only one of them, and only Finestone's[5] is cited in more than one. An early review paper in English[10] which strongly recommended thioctic acid therapy is not cited in any of the review papers despite the fact that it was cited by Finestone (although, curiously, not in connection with thioctic acid). This apparently low level of awareness of the relevant English language literature indicates a failure to conduct any comprehensive literature search even using *Index medicus*, since this indexed all of these English language papers.

Discussion

In the case of thioctic acid it seems that the problems caused by the foreign language barrier have been part of and exacerbated by a general failure to fully exploit the available literature and bibliographic tools, resulting in poor awareness of both English and foreign language material. Had adequate literature searches been made, the available published abstracts, though few in number, would have been sufficient to overcome the language barrier without the need for full translations. It seems reasonable to suppose that this may also apply in other cases and that consequently a general improvement in the coverage and use of the appropriate bibliographic tools should help to reduce the foreign language problem. Whenever the problem does arise, librarians should bear in mind the possibility that they may have the means to overcome it in their own collection of abstracting journals.

Note

A list of papers discussing thioctic acid therapy, indicating those indexed or abstracted, is available from the author.

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Buying short-run printing

J. G. Laird

General Manager, Woodcote Publications Limited

Paper presented at a one day Aslib/PIRA Conference, Print and the Library/Information Unit, held on 16 February 1977

What is short run printing?

THERE ARE PROBABLY as many definitions as there are print buyers, or printers, so we are not likely to agree on what we mean by short-run printing. However, the fact that I have been asked to speak on the subject implies that buying short-run printing is a problem, so let us define it as print runs which are so short that the printer does not want to do it.

Let us look at it from the printer's viewpoint. One of his major objectives is to keep his presses running. They are probably his most expensive asset and when they are idle it hurts his wallet. So for most printers the ideal job is one which reaches the press with the minimum of trouble and stays on the press for a long time with the minimum of trouble. So when you ask the printer to run off 50 or 100 copies for you, he is naturally less than enthusiastic. He has all the administrative chores of works orders, production control, costing and invoicing to go through on a job which will be on and off the machine while he blinks. You might get him to do it in the hope of getting larger jobs from you in the future, but that will not work more than once or twice.

He might refuse to handle it, or he might accept it and charge a price which makes it worth his while, which means you are paying too much. Perhaps worse than this, he may accept your work and then under pressure from more attractive and profitable jobs, put your job on one side and thereby miss your deadline! So we are faced with the problem of trying to persuade the printer to do something he does not like much. How can we find the right man and persuade him to take our work, and take it seriously?

Selecting a printer

1. Choose a small printer. Your work will be more important to him than it would to a larger printer and you will almost certainly get more attention and more personal service.
2. Choose a local printer. He will not be very interested in your work if he is constantly being asked to deliver two small packets twenty miles.
3. Go and visit him. You will get a much clearer impression of him and his abilities if you meet some of his staff and see his works than if you merely talk to his salesman. Also, he will be more interested in working for you if you show your willingness to take your work to him occasionally rather than always expecting him to collect it.

Aslib Proceedings, 29 (6) June 1977, p. 241–245. Printed in Great Britain

If you cannot find the right firm immediately, do not despair. There are over 7,000 printers in the UK and most of them have fewer than fifty employees. *Having chosen a printer, let's look at how we can get the best out of him.*

Specification

Be precise Do not say 'print it on a good quality paper' since his idea of 'good quality' may not be the same as yours. If you do not know what paper you want, ask to see some samples but do not drop the subject until you have made a firm decision. *Tell the printer everything.* It is no good telling him you want the job printed in two colours after he has made the plates, or that you wanted it packed in tens after he has packed it. *Put it in writing.* Then he has no excuse for saying he was not told what to do. Phone messages can be easily forgotten or misunderstood. *Be unambiguous.* Make sure your order cannot be misunderstood. Check your written instructions carefully, or better still, get someone else to check them. It is fatally easy to write something which is perfectly clear to you, but means nothing to someone else. For example (and these are genuine instances), 'If the baby does not thrive on raw milk, boil it' or; 'Nothing infuriates young women so much as the opinion of old men on the pill' or that well-known war-time headline 'French push bottles up Germans'. *Do not change your mind.* Decide exactly what you want before you send the job to the printer. Changing the job after the printer has started work is not only irritating to the printer, but can be very costly. If you ask him to add one comma and he has to make a litho plate, he will have to make a complete new plate. Worse still, if the job is a report and you want to add two lines to the beginning of a chapter, every subsequent page of the chapter may have to be changed. So do not be surprised if changes to the specification after the printer has started work cost you a lot of money.

Presentation of Material

If you are giving the printer masters or artwork to work from, make sure that you have prepared them in a way that he can use. I could devote several lectures to this subject alone, because so much of the artwork presented to us, even by professional studios or graphic designers (*especially* graphic designers) is incorrectly prepared and cannot be used until we have amended it. For instance, if you are going to use metric measurements, do not mix them with imperial. A client recently brought us artwork in separate pages for an A4 size brochure and we found that half the pages measured $11\frac{3}{4} \times 8\frac{1}{4}$ in., and the others measured 297×210 mm. Both are A4, but $11\frac{3}{4}$ in. is $\frac{1}{16}$ in. larger than 297 mm, so we had to reposition the trim marks on half the pages.

The only safe answer is to talk to the printer before you start preparing the artwork and ask him how he wants it presented. You can save a great deal of money this way. By the way, do not assume that graphic designers and advertising agents know how to prepare artwork correctly. Even the best designers often know far too little about print.

Estimates

If you want a valid estimate, treat it with the same care that you would when placing a job. All the same points apply as when we were talking about specifications. In particular, know what you want before you ask for a price. If you do not know what you want, you cannot expect the printer to give you a price for it. If you are asking several printers to quote, make certain they are quoting for the same job, in other words, make sure they each have the same specification. If your specification is vague, the printer has to decide exactly what you want and the chances are that different printers will make different decisions and so quote for different jobs and you will not then be able fairly to compare their prices. But do consider whether you really need an estimate. It costs a printer between £5 and £10 to prepare an estimate and if you ask him for a price on every small job you are not being very fair to him. In fact, he might be tempted to include the cost of the estimates in your jobs.

Provided you can trust your printer, you might save money in the long run by not asking for estimates, because he will quote a price for the job on which he is pretty sure he will not lose money. If the job turns out cheaper than he thought, he makes more profit, but if the job was not estimated you will be charged cost plus and you gain. Certainly if the job does not go well you may pay a bit more, but in the long run you should benefit.

Schedules

Do please be realistic. If you tell the printer that each job is urgent, the word 'urgent' begins to lose its meaning. On the other hand, you should always agree on a date for delivery with the printer and expect him to keep it. If you are prepared to accept reasonable delivery dates on most of your work, then he will be much more prepared to help you out on the odd occasion when you really do need something in a hurry. In this context, when you visit a printer, see if he has got an effective production control system. If he has, he is much more likely to be reliable with his deliveries.

Proofs

Ask yourself if you really need them. Of course, if the printer is doing the typesetting, proofs are essential. But if you are supplying masters or artwork they may be an unnecessary expense. Do return your proofs promptly. You really cannot expect the printer to meet your delivery date if you hang on the proofs longer than necessary.

Author's corrections

These can waste more of your money than anything else. The printer will of course correct free of charge, any errors he may have introduced but he will naturally have to charge you if you wish to make changes. It is always tempting, when presented with a proof, to try and improve the job by making changes you had not thought of before, but it will cost you a lot if you do.

Author's corrections very often occur when the proofs are shown to several people in an organization and it helps to avoid this if you can persuade authors to make their final corrections on their copy and then not see the proofs at all.

You will then not only save money on proof corrections but will be able to return the proofs more quickly and avoid holding up the job.

Payment

Many organizations try to cushion their cash flow problems by withholding payment to their suppliers for up to three months or more. But remember that the printer has spent the money you owe him before he has delivered the job and if you delay payment you are significantly increasing his costs. His reaction may be to refuse further work from you, since late payment added to the problem of handling short run print makes the job even more unattractive, or, more likely, he will charge you more to cover the cost of interest charges on your debt. So, if you possibly can, pay promptly and you will probably then find yourself looked after much better.

Extras

This is an area where the printer, sometimes deservedly, gets himself a bad name. It is the policy of some printers to cut their prices to get a job and then recover their money by bumping up the extras. There are several ways of doing this, none of which will be used by respectable printers. He may charge authors corrections at a higher rate than normal. He may claim that prices of materials have gone up since he estimated, when they have not. He may charge for overs at an inflated rate and forget to give you a credit for unders. He may even quote on one paper and then substitute a cheaper one. You should be aware of these possibilities because there are rogues in printing as in any other business. But most printers recognize that their business depends on their reputation and will not employ these tactics. However, genuine extras do often arise and you should not be surprised if any variation from the original specification costs you more. You would be wise, of course, to query any extras, but you will usually find that there are perfectly valid reasons for them.

Printer's advice

We recently quoted a job for one of our clients based on a detailed rough which he supplied. He then made what seemed to him quite small changes to the design and asked us to print it. But his seemingly small changes cost an extra £250. If he had discussed his ideas with us first, we could have suggested ways of achieving almost the same results at very little extra cost. This is true of very many of the jobs we handle. I should think that, if we were asked, we could suggest valid ways of saving money on almost half of our jobs and, indeed, a good printer will very often make such suggestions without being asked.

Concentrate your business with one firm

Usually, this is a poor policy; it is better to share one's work between two or three printers, especially if one has a wide range of printing. But we are talking about short-run print, work that generally speaking the printer does not want! If you concentrate it with one firm, then you have a better chance to get to know each other and let some teamwork build up between you and the printer. Also the printer will be more interested in your work if he is getting a reasonable turnover from you, even if it does consist of small jobs. The more valuable you can make yourself to the printer, the better will be the service you get from him.

- Almost every printer has a handful of clients for whom he will do almost anything, because he gets most of their work and does not want to lose it; because a relationship of trust has been built up, and because they do not continually make unreasonable demands of him.
- If you can form this sort of relationship with a printer, then you will have gone a long way towards solving your problems of buying short-run print.

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Printed at the Alden Press, Oxford

ISSN 0001 253X

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JULY 1977
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Aslib Proceedings

VOLUME 29 JULY 1977 NUMBER 7

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Aslib Proceedings *is published monthly and supplied free to members of Aslib. Annual subscription: UK, £22.00; Overseas, £27.00; North America, $65.00, additional copies to members, £11.00 ($30.00). Single copies UK, £2.00; Overseas, £2.50; North America, $6.00; members, £1.10 ($3.30).*

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Report of the communication games workshop

Judith Collins
Aslib Consultancy Department
Patricia Layzell Ward
Polytechnic of North London

ON THE 19th January twenty-eight Aslib members arrived at Belgrave Square to participate in an evening meeting called Communication Games: A Workshop, which was led by the authors. The presentation of the meeting in a workshop format was a new departure for Aslib, and initially gave rise to some hesitancy in the group. As the evening progressed and as the games were played, this hesitancy evaporated and the group came together in the sharing and learning which was the point of the meeting.

The first part of this article is a direct report of the workshop, the second part is a brief analysis of the responses to a questionnaire which was distributed to the participants.

Part I: The meeting

At the start of the meeting it was stressed that everyone attending the workshop was expected to participate actively. Patricia Layzell Ward opened the introduction by explaining the objectives of the workshop as to demonstrate, play and discuss some games which might help to improve communication within systems. The term 'game' was broadly defined as being any technique that might be used in a learning situation by an individual or a group and it had been selected so that the session might be approached in a spirit of anticipation, involvement, fun and enjoyment. With a limited period of time available, it would only be possible to select four games and gain some experience of their organization, a feeling of participation and see the unexpected that could happen and difficulties that might arise. The justification for the workshop lay in the small amount of time devoted to communication in training librarians and information workers nowadays and its complete absence in courses offered several years ago.

It was stressed that it was not the intention to get involved with sensitivity training in the course of the programme, but rather to concentrate on games which might be of value in training programmes. Two aspects of communication within systems were to be singled out. First, communication between user and staff, where improvements in this information flow can result in an increase in the effectiveness of the service. The second aspect of communication within systems was between staff at all levels. Whether a management style is autocratic,

Aslib Proceedings, 29 (7) July 1977, p. 248–252. Printed in Great Britain

democratic, participatory or whatever, any improvement that can be made in the communication that necessarily has to occur can only be beneficial to the performance and health of the organization.

Judith Collins continued the introduction by focusing attention on non-verbal communication; it has been estimated that no more than 35 per cent of the social messages in a conversation is spoken—the remainder being non-verbal. An overview of the ways in which non-verbal communication is used was given and some overt signals demonstrated. It was emphasized that the study and recognition of these signals depends on accurate observation of interpersonal reactions. The hope was expressed that any feelings of self-awareness engendered in the participants would be used to encourage this observation.

Mirror games

The objective of a mirror game is to formalize observation of one other person and to encourage a specific reaction to the observations. The participants divided into pairs and stood facing one another. One person of each pair then performed some routine action which would usually be done in front of a mirror and the second partner in the pair became the mirror image. The roles were then reversed, with the initiator becoming the observer and actions not normally done in front of a mirror being performed, with the other partner copying the action minutely.

The usefulness of this game is mainly that it overcomes our timidity about looking closely at someone else. To play this game successfully the participants must observe each other in very great detail in order to copy each movement. It has been found that people who try to claim dominance in social situations tend not to look at others; playing a mirror game encourages dominant individuals to look at others and rewards them by improving the social interaction (*i.e.* the game works) in direct proportion to the accuracy of their observation.

Fishbowls

Participation in a fishbowl is a group experience which can be used as a process in two different situations. First, it can be a means of communicating information from a small to a larger group when a formal presentation may be unsuitable, *e.g.* from a small group working on the development of a new service to a larger group who need to be aware of plans or actions. In the second type of situation a small group may be working on a problem, but require the assistance of observers. For those having responsibilities for staff development, it is a means of observing individuals working in a group situation.

The game requires two circles of chairs. The inner circle contains those working on the problem or conveying information plus an additional unoccupied chair. The outer circle contains the observers, who may only join the discussion by taking the vacant seat in the inner circle which can be vacated when their point has been discussed. In the communications workshop the topic discussed was the need for a merger between Aslib, the Institute of Information Scientists and the Library Association. The benefit of the fishbowl technique is that it is spontaneous and that there is healthy pressure from the observers to keep the discussion to the point and to participate in an exchange of ideas. In a group having a high level of trust it is possible to introduce an element of critique. It may be necessary to have an observer briefed to make notes of the discussion for future action.

Going around the room

In this simple game the leader of a discussion simply goes around the room asking each person in turn to give their opinion, views or state their feelings on the discussion topic as briefly as possible. It is a helpful way to 'take the temperature' at a meeting, to gain feedback, or to reveal potential conflict points. It can bring a meeting to a close, or be used when a group appears to have run out of ideas. It permits everyone's ideas to be heard and prevents domination of one individual's ideas or views.

At this stage each participant stated his/her feelings about the progress of the meeting so far. This provided significant feedback to the workshop leaders and certain points were referred to in the later discussion.

Experiential exercises

At the meeting this game was played in pairs, with one partner experiencing a situation and the other listening and prompting, but in fact the game can be played alone. Participants were asked to imagine walking into their own library or information unit, not as themselves, the probable managers of the units, but as strangers. They then put into words to their partners their observations and feelings about, for example, the library layout, the library staff, how long it took for the library staff to acknowledge their presence, did the staff smile at them, etc.

This game can be structured into a whole series of exercises in which each individual imagines him or herself in a number of everyday activities, but in each case experiencing these activities as a different person. The value of the game is that it shows one way in which we can observe ourselves at work by imaging. It can also help us to understand the feeling of staff, management and users.

Summary of Part I

There was a limited time available and only four communication games were played. Two of the games, namely fishbowls and going-round-the-room, were designed to encourage observation of group behaviour and encouragement too of feedback by individuals to the group. The mirror game and the experiential game were more intimate, in that they encourage close personal observation on a one-to-one basis and the expressing of imagined experience.

The balance between the time spent on group games and that spent on individual games and the overall effectiveness and enjoyment provided by the games, concerned us as the workshop leaders. At the end of the meeting we distributed a number of documents, including a questionnaire which was designed to assess the participants' responses to the evening and to allow for feedback about effectiveness. Before going on to analyse the completed questionnaires we would like to set down some of the constraints as we saw them operating at the meeting:

1. We faced a number of problems in working with people who were not only 'strangers' to us but who also were 'strangers' to each other. The only common denominators in the group were interest and, to a degree background, in that we were all information workers. The problem we faced here was that the games are more likely to be successful, enjoyable and effective when played by a group which has developed a certain level of trust or confidence in itself. The participants formed a 'cold' group that had not had the opportunity to build up this trust.
2. Our second group of problems was our own awareness of the fact that we were untrained. While both of us had acted as participants in these and other games and had led them in other types of groups, we were still aware of our own lack of experience in leading these games in our professional field.
3. We were a bit taken aback by the size of the group at the meeting. In an ideal training situation—or even in real life—effective groups usually consist of less than twelve people. At the meeting we formed a group of thirty.
4. Our final 'operating constraint' was our awareness of the overwhelming interest in the topic; we knew of some courses being planned and run which used some communication games, but the degree of interest shown was more than we anticipated.

We were aware too that the games were at a very low level of sophistication when compared to the level of training conducted in some large industrial companies. However, we believed that we were more than justified in presenting these games to those information workers who would not otherwise have access to these techniques.

Part II: The questionnaires

We decided to distribute very simple questionnaires for two reasons. Our first point was that it is very common for the enthusiasm engendered by a workshop to overwhelm the objectivity of the participants, therefore we deliberately solicited 'morning-after' reactions. Secondly, the use of the games technique was a departure for an Aslib evening meeting and therefore provided a unique opportunity for assessing its effectiveness.

The first question was the straightforward *'Did you enjoy the games?'* The answer to this was a resounding yes from all the respondents except one.

The second question, *'Did the games help your understanding of the communication process?'* produced some very helpful comments. About half of the respondents named the group games as being helpful and about one-third specifically mentioned the individual games as being helpful.

We asked if the participants found the games of *relevance* to their work and if they would use them in their training programmes. The answers here came mainly into the 'yes, but' category. Several respondents said that they could not see the relevance to their work because the style of the games was inappropriate to the culture of their organizations. Similarly, a number of respondents worked in very small units and did not have formalized training programmes for their staff and therefore would not be able to use the games as such.

The final question was open-ended and asked for *any other comments*. Some three themes became apparent as we analysed these responses. The theme mentioned most often was a request for a longer session with a smaller group; a full-day workshop with more theoretical background and assessment was suggested by a number of people. The second theme implied that use of more sophisticated techniques would improve the enjoyment of the games, in that closed-circuit television video recording and the use of actors trained in role playing would remove some of the self-consciousness induced in some of the participants.

The third and final theme crystallized around the question 'It is all very well being aware of all these different types of communication, but what is the optimum mix of verbal, written and non-verbal communication in a library or information unit?' This question is of such fundamental importance and implies so much research and analysis that we cannot go any way towards suggesting an answer. However, we are convinced that increased awareness of the communication process and the continual monitoring and assessment of its effectiveness will produce an answer for one given place at one given time.

Conclusions

The objective of the meeting was to demonstrate, play and discuss some games which might help to improve communication within systems. The first part of this article has recorded the way in which we demonstrated and played the games. At the end of the meeting we had a discussion about the use and usefulness of the games. Judging from our feelings after the meeting and from the questionnaire responses we believe that we not only met our objectives but that we were encouraged to continue and develop this understanding and to apply it to our profession.

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Comparison of manual and online retrospective searching for agricultural subjects

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To investigate the value of externally available computer-based bibliographic retrieval services in agriculture, 100 retrospective searches in response to real requests for information were carried out by computer. Seventy-five of these were paralleled using conventional manual methods and the results were analysed and compared for efficiency, cost and staff time required. The databases most frequently used were CAIN (now AGRICOLA), BIOSIS and Chemical Abstracts Condensates (searched online using Lockheed Dialog), and Medline. Online searches took one-sixth of the staff time required for manual searching and cost much the same. Online searches tended to have higher relative recall and lower precision than manual searches of the same database. The differences in performance are due to the different entry points available in the printed and machine-readable forms of a database. Detailed knowledge of these will enable a choice to be made of the more efficient method of searching when both manual and online searching of a database is possible. Online searches were well received by users and their use could increase the output of library and information staff engaged in retrospective searching.

Introduction

The outstanding development in information retrieval during the last few years has been the widespread availability of online computer-based bibliographic information services. An indication of the meteoric rise of online searching is given by the fact that a review article of 1971[1] discusses computer-based retrospective searching without mention of interactive systems.

Although there is now an extensive literature on the subject[2] for example, we found that no large-scale evaluation of databases of interest to the Ministry of Agriculture, Fisheries and Food (MAFF) had been reported. In particular, little literature existed on the comparison of manual and machine searching, in which we were particularly interested. Index Medicus[3]/Medlars[4] was the only database of interest to us which had been compared in its printed and machine-readable forms. Therefore, to give us factual information on the practical value to MAFF of externally available computer-based retrospective search services, a two-year investigation was instituted. The results, reported in full by Johnston and Gray,[5] are summarized below.

Methodology

It was considered that the investigation should take place within the framework

Aslib Proceedings, 29 (7) July 1977, p. 253–258. Printed in Great Britain

of the normal information activities of MAFF. Its main object was to determine whether any of these activities could be performed more efficiently and economically by computer. Therefore, we monitored real requests for bibliographic information received by MAFF libraries and information units, selecting items for study which, in total, would be representative of the different disciplines and types of institution in the Ministry.

Each request for information was satisfied by a computer-based search, often of several databases. Seventy-five per cent of these were paralleled by manual searches which, in many cases, covered the printed form of the database searched by computer, enabling comparison of the two methods to be made.

As the investigation was intended to be realistic, users' pertinence ratings[6] were obtained for both manual and machine searches. Users were asked to assess each reference and to mark those of major and minor value to them. This enabled figures for major-value precision and major-value relative recall, as well as overall precision and relative recall, to be determined for each search. Precision can be improved by an intermediary deleting from the search results any references which do not seem to be useful. The effect of this screening was studied by marking unobtrusively, for some searches, items deemed irrelevant before sending the search results to the users for evaluation. This enabled the performance of screened and unscreened searches to be compared.

Both manual and machine searches were costed. Online search costs included terminal time charges, offline prints, communications charges and staff time spent in preparing the search, operating the terminal and handling search results. Manual searches were timed and only basic staff costs calculated. Accommodation and overheads were not included, and neither were the costs of information tools such as abstracts journals. To some extent, therefore, the cost comparisons favour manual searching. This was accepted as realistic, as neither accommodation, overheads nor subscriptions to abstract journals were likely to be influenced in the short-term by the use of computer-based systems. As exchange rates were varying throughout the investigation, all costs were adjusted to the exchange rates of July 1975. Similarly, staff time was costed at the salary rates ruling at that date.

Sources used

The computerized databases searched during the investigation were those of agricultural interest which were accessible at the time. Although a few searches for earlier material were done in batch mode via information centres, most of the computer searches were conducted online, using the Lockheed Dialog and Medline services, and it is the results of these online searches that will be discussed below.

As the Commonwealth Agricultural Bureaux database was not available online at the time, most of the computer searches were done on CAIN. CAIN, now called AGRICOLA, is the CAtaloguing and INdexing system of the US National Agricultural Library and was searched online using Lockheed Dialog. CAIN covers all aspects of agriculture and includes both research and extension material. Retrieval from CAIN relies mainly on document titles, some of which are enriched, and the broad category codes, so that there are a relatively small number of entry points available.

BIOSIS Previews was also searched online from Lockheed. It is the database of the BioSciences Information Service of Biological Abstracts and covers research literature only. As well as titles enriched by many free-language descriptors, the detailed coding systems can be used for retrieval, giving a large number of entry points. Systematic names for all important organisms are added and can be searched with confidence.

The US National Library of Medicine's Medline service was searched online via the ARPANET as part of the British Library's online experiment. The database, which can be searched back to 1966, is deeply indexed using the hierarchical MeSH thesaurus, but free-language searching of titles and the limited number of abstracts included was also possible. With the large number of entry points, the recall potential is high.

Chemical Abstracts Condensates was used comparatively infrequently, again online from Lockheed. The main entry points available were title words, keyword phrases from the issue indexes and the codes used to divide the items into broad subject areas.

Whilst the above four databases were the most frequently searched, others such as Inspec, Nuclear Science Abstracts and Oceanic Abstracts were used when appropriate.

The manual sources were mainly the printed versions of the databases searched online, *e.g. Bibliography of Agriculture* (derived from CAIN), *Biological Abstracts* and *BioResearch Index* (BIOSIS), *Chemical Abstracts* and *Index Medicus* (Medline). Sometimes abstract journals not available online, such as Commonwealth Agricultural Bureaux journals, were searched manually to provide coverage comparisons. In appropriate instances various MAFF files and personal indexes were used.

Users' reactions

During the investigation 100 computer searches were carried out, the majority online, 75 of them being paralleled manually. The users' pertinence judgments and overall comments were obtained for nearly all of the searches, enabling precision and relative recall figures to be calculated. We consider that the searches varied so much in nature and complexity of topic that averaged performance figures would be meaningless, so the searches were regarded as case studies. A detailed study of each search, including performance figures, is given in the Appendixes to the report,[5] a copy of which has been deposited in the Aslib library. Manual searches tended to have higher precision than computer searches of the same database, with the computer searches tending to have higher relative recall. However, in the users' overall assessments of the value to them of the search results, there was little difference between manual and machine searches. Users were, however, somewhat more critical of the amount of irrelevant references in computer-based search results, a reaction which might be expected as manual searches would tend to be more precise. About 10 per cent of the users found irrelevant references inconvenient and in most of these cases the search results had less than 0.20 precision. Other users accepted a similarly low precision level but, although precision tolerance is a personal attribute, it would seem desirable to aim for a precision ratio of greater than 0.20.

Many users expressed general satisfaction with the results of computer searches. This, with the clear indications we had that they were at least as effective as comparable manual searches, indicates that computer-aided searching provides results quite acceptable to users.

The choice between manual and computer searching

As implied above, often, when searches of the same database were made both manually and by machine, somewhat different sets of references were retrieved. This indicates that if high recall is essential *both* methods must be used.

The difference in performance is due to the differences in entry points available for searching between the printed and computer-readable forms of a database. No general statements are possible; the differences are peculiar to each database. In Medline, for example, a large proportion of the assigned index terms are only in the computer record and are not available in the printed *Index Medicus*. CROSS and BIOSYSTEMATIC codes are available in both printed and computer forms of BIOSIS, but the printed version is so cumbersome to use as to be almost impractical, especially when a high level of co-ordination is required. The volume indexes of *Chemical Abstracts* index such processes as analytical techniques only if the item is a review or describes a technique without mentioning applications to specific substances. However, techniques are frequently mentioned in titles and the keyword phrases of the issue indexes and are thus available as entry points in a computer search of *Chemical Abstracts Condensates*. The volume indexes of *Chemical Abstracts* do score over *Chemical Abstracts Condensates* for retrieval of references on specific chemicals. This is confirmed by Buntrock[7] and Michaels.[8]

In practice, for economic reasons, the use of manual and online searches of the same database in parallel is likely to be infrequent. The choice between them can, however, be made with confidence after considering the differences in entry points available in the printed and machine-readable form of the particular databases selected as appropriate to the query. In each case it is necessary to consider the level of specificity of the parameters of the search and the ease in which the terminology of each parameter can be expressed in the various types of entry point available.

Manual searching usually relies on the location of subsets of candidate references grouped under index entry points. The manual searcher is then able to interpret the information given about each document to determine which are likely to be relevant. A manual search is likely to achieve better results than a computer search when the subset location is easy, the subsets comprehensive without being unwieldy and the criteria to be applied to the documents of the subsets are diffuse, needing the manual searcher's powers of deduction. The printed subject indexes used for manual searching may not be suitable for some topics because of their particular emphases. In these cases, subsets of candidate documents are difficult to isolate and occasionally the manual searcher can find no appropriate subject approach. When this is so, the computer search can be much more effective, as the searching of titles, or other extra entry points, may give adequate if not comprehensive recall. Familiarity with the printed indexes will enable a searcher to forecast whether the concepts he seeks are likely to be grouped in a useful manner in the printed index, or whether any extra entry points provided in the computer version of the database could be of more use in expressing the search parameters.

One frequent disadvantage of manual searching is that many of a document's index entry points are unavailable to the searcher as he scans the index. The computer, however, can co-ordinate different types of entry point and the physical order of these is unimportant. Computer searching can also take better advantage of any hierarchical structure in those systems using fixed index terms.

The key to choosing between manual and computer searching of a particular database thus lies in detailed knowledge of the difference in entry points between the two forms of the database, and of the ease of expressing the concepts of the search in terms of these entry points. Each database should be considered separately, as a search very suitable for computerized retrieval in one database may be better done manually in another database due to differences in indexing. Finally, if staff time is limited, online retrospective searching can usually be conducted in a fraction of the time needed for a comparable manual search.

The effect of manual screening on computer search results

In some searches, references considered relevant by the searcher were unobtrusively marked before the lists were sent to the users for pertinence assessments. If only the marked items had been sent, in most cases some pertinent references would have been deleted. This is due to the fact that the user's expressed requirements do not always match his intuitive needs and consequently his pertinence ratings do not always correspond exactly with his original question as stated. Most users seemed to prefer to select appropriate references from a broad list and consequently screening by an intermediary is seldom necessary.

Manual screening can, however, play a useful part in a computer-aided search. It is sometimes easy to produce by machine a set of references covering a broader topic than that required. When it is difficult or time-consuming to

Database	*Terminal Time (mins)*	*Computer Cost (£)*	*Staff Time (hrs)*	*Staff Cost (£)*	*Total Cost (£)*
CAIN (Lockheed) (66 searches)	16.32	10.60	0.49	1.80	12.40
BIOSIS (Lockheed) (29 searches)	12.85	14.20	0.37	1.35	15.55
MEDLINE (NLM) (18 searches)	13.30	12.36	0.42	1.54	13.90
CAC (Lockheed) (10 searches)	14.12	13.70	0.42	1.54	15.23
Manual searching (62 searches)	—	—	3.36	11.86	11.86

TABLE 1: *Times and costs per search for online and manual searches (July 1975 figures)*

refine the search online, it can be more efficient and economical to search an offline print manually, selecting the appropriate items.

Costs

Online and manual search times and costs for the four databases of particular interest to MAFF are given in Table 1. The striking feature of Table 1 is the similarity between costs of online searching and manual searching. The manual searches were costed using minimal basic staff cost figures only; even on this basis, which favours manual searches, the computer was only slightly more expensive. There were, naturally, considerable variations in timings and costs for all categories of searches. For instance, an appreciable number of online searches cost less than £5 and some manual searches took less than an hour and were correspondingly cheap. The average terminal times for the various databases were fairly constant at 12–18 minutes. Online computer searching, which took an average quarter of an hour of terminal time and a further quarter of an hour of staff time in preparation, thus costs much the same as a comparable manual search, but takes less than a sixth of the time.

Conclusions

1. The investigation, which as far as possible was undertaken under realistic conditions, indicated that the use of present externally available online information services for agricultural queries is an efficient and economical alternative to manual searching. In other subject areas served by similar online databases, it is probable that a similar situation exists.
2. The use of online systems should be developed within a library or information unit as a normal activity. For some few queries it will be the only satisfactory way of searching, just as there are some searches which can only be done manually. The majority of searches, however, can be made either way, but, as online searching takes far less time than manual searching, it can be used to increase the output of library and information staff.

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The impact of copyright on the future of scholarly publishing

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Introduction

I HAVE BEEN invited to write this piece in my role as publisher of some 130 scientific and technical journals. I do not know how to write such a piece from that point of view. It is true that many of us are blinded either by positions of power or achievement so that we think of ourselves in such a delimiting way. I can hold no brief for publishers *qua* publishers and try to think of myself as a philosopher-humanist rather than as a publisher. It troubles me that in the realm of the subject that I will be discussing, namely, unbridled photocopying—which, in my opinion, will lead to the imminent demise of the already developed communications skein—we find that this subject has been most often dealt with by technicians (rather than philosophers) driven by their own egos and dreams of power, or by an overweening brashness that assumes that Technology can, of course, supply solutions to all our problems. Technicians have often been called upon to find the Final Solution and philosophers have had a hard time coping with what may seem, on the surface at least, to be something that technicians claim is the solution to the problem mooted. It is, unfortunately, rare that technicians can step back from their own dearly cherished pursuit of technical solutions to problems in order to ask the basic and searching Hegelian philosophical questions that need to be asked *a priori*. In a small sense, what I have said is unfair to technicians since, before they go to work on the problem, they are either asked to do so *qua* technicians (a mistake on the part of the askers) or seize their own opportunity without waiting for the invitation. And yet, technicians are not alone in this myopia; ordinary people often opt for what seems like the handy-dandy rapid solution to all their half-understanding of the 'problem' without giving due consideration to its long-range consequences.

Most of us cluck our tongues at tales of muggings in the streets, SST's depleting our ozone, chemicals impregnating our foods and super-spy agencies prying into our personal lives. Broadcasting companies understand well the currency of this tongue-clucking syndrome and recognize that most of us are so beaten over the head in the seventies by one tragedy after the other that we are primed and almost eager to watch the violence being brought into our living rooms each night. Well, I am not ready to accede to this brainwashing and, therefore, I insist on thinking for myself, and as unpopular as it may be I do not intend to join the throng of lemmings who cluck their tongues and do nothing.

Aslib Proceedings, 29 (7) July 1977, p. 259–265. Printed in Great Britain

Implications of unbridled photocopying

It is with this approach in mind that I intend to focus on the longer-range implications of unbridled photocopying. If what I will say sounds controversial or harsh or salty, it is offered as an attempt to examine this problem critically with no punches pulled or shibboleths left standing.

1. First, let us address ourselves to those technicians once more and the nature of the technical problems they are asked to solve. Take tomatoes. They bruise easily, especially ripe ones. Ripe tomatoes do not travel well unless they are refrigerated. Furthermore, tomatoes rot rapidly once they are on the greengrocer's shelf and therefore develop problems of spoilage and, ultimately, waste. The problem of tomato shelf-life was rapidly solved by technicians. Tomatoes now are picked green, injected with various chemicals to make them look red, travel fantastically well and wind up on the greengrocer's shelf practically inedible. There is a whole generation of Americans that does not know what real tomatoes taste like. Examples of deterioration in our lives due to such Progress will occur to you, I am sure, *ad nauseam*, all the way from the plastic food we eat to the lightweight metal that shields us from death when we travel in our cars. These are the technical solutions created by technicians solving specific problems of commerce.

2. That they are also tampering with the quality of our lives is not really the question posed to technicians nor, for that matter, considered by them. The question posed is the question answered.

And yet, of course, it is our very lives and lifestyles that technicians are playing with.

Which one of us would opt for Orwell's 1984 as a world which we would *like* to inhabit? I have purposely italicized this word because the italics assume that if we had our druthers, as they say, we could opt for a way in which we would like to live. To deny this for starters is saying pointblank that we are not the captains of our own ships and the masters of our own fates, but that somehow we are caught up in some horrid, forward-moving juggernaut over which we have no control. I have never believed this and do not believe it now. Human beings, by exercising their free will and free intellect, can indeed still plot the course of their own lives, although this act requires great energy and greater courage. To return, then, to my rhetorical question, of course none of us would opt to live in the world represented by 1984.

Think the matter through carefully. Assume with me for the moment that unbridled photocopying can and will lead to the demise of journals as they now exist. Assume with me also that this will come to pass because with free, or at least cheap, access to separate articles and with the further advent of library networking, the subscription base to all journals will deteriorate, causing higher and higher prices which, in turn, will cause a lower and lower number of subscriptions until the publication of the journal will no longer be viable. I will refer to this doomsday scenario from time to time in this paper, so let us assume that I am right, solely so that the argument can then be presented from that point of view.

Will the information disappear because there are no journals in which to house it? Of course not. Will there be some alternative? There are a number of alternatives: some mooted, some not even dreamed of yet. We can look toward the possibility of what is called the 'electronic alternative', a kind of do-it-yourself publishing, which would require hundreds of millions of dollars of investment since this would be a network which all producers, authors and users could plug into. Who could afford to invest hundreds of millions of dollars to fund such a network? Obviously, it would have to be Government (for which read Big Brother) or one of the giant, multi-national conglomerates (for which read Big Brother's brother). Or one might see some company with the hardware network in place take over the hard-copy archiving of the material, tied in some fashion with electronic access. Well, who are the owners of the hardware networks? Giant multi-nationals (for which read Big Brother's brother, as I have stated above).

In short, then, the question a philosopher would have to ask would be: is it likely that unbridled photocopying will lead to the demise of the open scientific communications skein as it now exists and therefore lead inevitably to either Big Brother or Big Business controlling all information? Along with control of information and the ability to disseminate goes the ability *not* to disseminate so that the ownership of the information and the means of disseminating the information implies the ability to censor and to decide what will and will not be disseminated. In the skein of scientific communication as it now exists, copyright is vested most frequently in the publisher and obviously, the publisher, too, has in his hands the ability to disseminate or not to disseminate. The fact is, however, that the entire publishing industry, as it relates to scholarly and scientific materials, taken over the whole range of publishing companies throughout the world, is not as large as a single Fortune 500 company. Thus, if you put together the resources and revenues of every single publishing house in the world (assigning only that portion that deals with scholarly and scientific publishing), that aggregate would not be the equivalent of the revenues and resources of one single multi-national company. Therefore, publishing, as it stands now, affords a great multiplicity of voices and inherently, a great competiton for the privilege of imparting information used for scholarly communication to the world. The difference is an obvious one: 1984 exists when either Big Government or Big Business has become the all-powerful controlling giant. 1984 can only occur under such circumstances. There are thousands of publishing enterprises today. They are our safeguard against Giantism.

Standing back from what I have just said, it would seem to me one could have several reactions:

1. Poppycock! You have not made your case.
2. But that is the way the world is going and, while I can cluck my tongue, I have no power to do anything about it.
3. But what about my short-range problem, even granting your long-range one? The cost of these journals is very high, my library needs them or, at least, needs to service its clientele, and what else can I do but go down this road, even if it winds up as disastrously as you have just said?
4. But we have a telephone system, haven't we? And that is not so bad. Think of how difficult it would be if we had several telephone systems all servic-

ing the same town. We need a monopoly over *some* things, even though it is true it is Big Business and, of course, works in partnership with the Government that regulates it.

5. I never heard anything so reactionary in my life. What about Progress? What about Growth?
6. And how do we manage the *flood* of scientific publications with which we are being paper-*inundated* unless we are capable of creating an information system that, paradoxical as it may seem, allows all of us to tap into that part we want of it at our own chosen moment?

Of course, I might hope for *this* quasi-question:

7. You are absolutely right. I had not ever seen this matter in the way you have just posed it, and, since I *am* a human being and not a robot and *not* in the grip of forces totally beyond my control, I shall now direct my thoughts toward how we can avoid the obvious mess into which we are getting ourselves.

Answers to the reactions

There is no answer to reaction no. 1. None that I can make in any event. Just because I can see plainly that what I have described is the way it will fall out does not at all mean that the next person will discern it in the same fashion. My argument, therefore, will sound either logical or foolish because the conclusion that I have reached will seem either logical or foolish.

The answer to no. 2 is complex. We have to start with the premise that there is no such thing as a free lunch and never was. The price of the free lunch was the glass of beer that had to be bought. The price of cradle-to-grave security is the yielding of your freedom to a Government which, no matter how benevolent, is still in power over your life. Thus, we pay a price for everything. While we cluck our tongues at the Arab embargo, we pay a price for petrol because we must—as well as for oranges, chemically impregnated tomatoes, etc., without end, including $4 for a pound of coffee, with tea prices rising in *sympathy*, so to speak, in my country at least. Would you hold with me that information is priceless? Then how in the world can we place no value on disseminating, accessing, storing, retrieving and delivering it? How in the world can we believe that it is free of cost to *use* it? How can we believe that this is *one* service cost for which we do not have to pay? Oh, someone has to pay in some form because if we do not pay in terms of money, then we will pay in yielding our freedom; our freedom of expression and the *freedom* of information yielded to Government or Big Business. So we *will* pay. It depends simply on which coin we wish to use. So, do we have the power to do something about it? Yes. There is a clearinghouse being developed at this very moment in the US and that clearinghouse will collect payment for separates, presumably at prices high enough so that the subscription base is not eroded to the disaster point. At the same time, other organizations are making arrangements with publishers to sell separates as well: National Technical Information Service, Institute for Scientific Information, Information Unlimited and many other on-demand information companies. The Something you can do about it, therefore, is this: you can indeed buy separates from BLLD which pays nothing to anyone and blithely follows the path that there is a free lunch and, therefore, free information and can therefore supply your demands at low charges *now* (which must have the effect of eroding the subscription base for the journal), or, you can *pay* a legitimate price for the information you receive in order to protect the information skein. If you will recall my argument that there is no such thing as a free lunch, you will realize that the free, or cheap, copies you are getting from BLLD may, in fact, cost you your liberty. And may cost all of us the destruction of the skein of information that now exists. And may cost you Government control or Big Business control of all communicated information *in the long run*. And the choice is a simple one: either you are going to be concerned, as I am with the long run *or* you are going to be concerned with eating your free lunch now and either paying more for it later or letting your children pay for it later.

I will not skimp on the necessary and thorny answer to question no. 3, namely, if you have the foresight to be concerned over the long-range problem, nevertheless, how do you solve your short-range problem? Money, of course, is the answer and that money can come only from two sources: Government subsidy or the User. It cannot, as I have demonstrated, come from the producer because that must, of course, destroy the integrity of the product because producers will not produce for nothing. Now, the Government has plenty of money to spend on bombers, space shots, bail-outs of ailing companies, etc. It seems amazing to me that STI information is so highly valued and so priceless and yet no one in Government can get excited about the necessity for preserving its unique values to society and, even more to the point, paying for it. Everyone knows you cannot buy a bomber without paying for it but, for some reason which eludes me, an STI information product, which is produced with the imagination, intelligence and capital resources of authors and publishers, can presumably be had for nothing and, furthermore, the notion can be held as some high moral principle that whereas the user does not have the right to an orange or a pair of shoes or an automobile (just because he wants them) without paying for them, for some reason I am blind to, he can indeed ask for and receive an STI information product for no payment whatsoever. Thus, we come to the other place at which you can solve the problem of where the money is coming from, namely, from the User. If Government turns a deaf ear to your plea for money, which you should make in any event, then you are going to have to recognize that the Carnegie philosophy no longer applies and that the User cannot expect a free lunch any more than the rest of us and some kind of payment system is going to have to be developed if the research library and scholarly publishing are to remain viable.

There are many aphorisms concerning point no. 4. 'He who learns nothing from History is doomed to repeat it' is simply one of them. We have noted the fall of the Roman Empire, strangled by its unlimited growth and no sense of priorities as to where to put its money. We have seen the ancient empire of Greece fall apart for exactly the same reasons. In more recent times, still other empires have fallen, or are falling, apart—again, for the same reasons. Just as in the Thirties we had a blueprint for the future in *Mein Kampf*, we have a blueprint for the future in front of us in Orwell's *1984*. Is it not apparent to every one of us that we must avoid such monopoly of control with all the strength we can muster? The enormous struggles going on right now in the communications business, pit one industrial giant against various other multi-national conglomerates in their struggle to enlarge the scope and control of their stake in communications. Control of the size of Government and Business is indeed a concern of every citizen in the world, as is the correct ordering of priorities.

In thinking of Progress my mind turns to Shakespeare who said, 'all is not gold that glistereth'. It all depends on what human Progress is supposed to mean. The slogan of one important company is 'Progress through Chemistry'. Well, there is indeed *some* progress through chemistry, but how progressive is it for me not to be able to eat a decent tomato, a loaf of bread that does not contain more chemicals than it does nutrition, a slice of beef that is not shot through with Heaven-knows-what, an orange that is not artificially coloured, a piece of candy without red dye number 2, which is now banned in the US? And what about aerosol cans? And what about SST's? And what about the proliferation of nuclear power? How about MIRV? I wonder how terribly reactionary it is to want to see a world in which it is pleasant to live, where noise does not bombard my every moment and where I am not brainwashed into accepting that which is demonstrably bad for me. If that pits me against Progress, then I think all of us had better understand that we all had better get pitted against non-human Progress rapidly before we destroy this fragile planet.

Question no. 6 is, of course, the repetition of a myth. There is no flood; there is no inundation. And these scare words are used in much the same way as Generals use scare words in order to create situations of overkill. There is a 'missile gap' or a 'bomb gap' or a 'sonar gap' or some other kind of 'gap', and that is why we need the next $10 billion in order to 'catch up'. We now must deal with the 'flood' of information. How about the fact that there are more scientists extant today than ever before in the history of mankind? And how about the fact that there are more people on earth today (as a matter of fact, double the number of people than there were only a very short time ago)? And how about the fact that the very existence of all of these people *requires* the production of enough information to guide such an enormous enterprise? Yes, we must find ways of managing the information, but those methods cannot be allowed to destroy the quality of our lives. Nor is this the first time that we have been urged to emasculate ourselves. One of the more recent times was in the reign of Joe McCarthy who explained to us that we had to curtail our liberties in order to preserve them. Indira Ghandi told her subjects that she was only using dictatorial powers for their own good. The list, obviously, can go on and on. The fact is that we have already developed abstracting services, indexing services, synoptic journals, data banks, data retrieval systems, etc., all for the handling of this 'inundation' of information. There have now sprung up information-on-demand companies eager to supply information to *anyone* who is willing to pay for it. Ah, there is the rub. That presupposes that there is no free lunch and that people are going to have to be willing to *pay* for information just as they pay for all other consumer commodities. Those who are warning us about the flood would have us create an Ark of free information sailing on the seas of all other commodities (all of which must be bought and paid for) with, somehow, the Ark itself kept intact perhaps to be washed up on Ararat or Shangri-la.

I have been a working poet for almost the last four decades and I have often been asked: 'Why don't you write more simply?' And I have answered: 'Because what I am trying to say is so complex.' A more factual answer would be that being a poet is a lifetime occupation, but one poem cannot command more than a finite amount of time and energy. Surely, what I am trying to say here is as complex as any subject I have ever handled, and yet, I have been involved in this intellectual discussion for at least the last 10 years. It is for that reason that I have been able to say what I have just said as simply (I trust), albeit longwindedly, as I have. I hope that the several re-writes that this piece has undergone will have helped us all focus on the questions, whether or not you agree with my conclusions. In capsule form, these conclusions are:

Conclusions

1. That scientific journals and the entire open literature of scholarly publications are right now an endangered species.
2. That part of the reason for this is unbridled photocopying and *cheap* access to separates.
3. That the information skein has to be protected because in its demise it must be followed by:
4. A takeover of the means for retrieval and delivery of STI information by either Government or Big Business, which must lead to:
5. The *control* of STI information by Government or Big Business and, therefore, the implied threat of manipulation of our very minds. Therefore, we must learn to accept the fact that information is a commodity which must be paid for, and the money to pay for it must come from either a reluctant government or reluctant users.

I would be pleased to correspond with the readership of this journal directly or through its pages as to what alternative scenarios would be appropriate and reasonable. Your ideas are welcome.

BRIEF REVIEWS

WICKS, VERA M. *ed.* Directory of special libraries in Australia, edited by Vera M. Wicks for the Special Libraries Section, Library Association of Australia. 4th ed. Sydney, Library Association of Australia, 1976. 310 pp. $20 ($15 to LAA members). (ISBN 0 909915 40 7.)

The introduction to this directory has a very useful table which any British special librarian would envy, showing, by state, the number of special libraries at the time of each edition of this directory, *i.e.* in 1954, 1961, 1972 and 1976. The directory itself is divided into eight sections by state. Each entry has details of: address, phone number, National Library Symbol, SSAL Symbol, hours of opening, date of establishment, librarian and staff, stock, classification used, main subject fields, availability of photocopy and interlibrary loans, when applicable/available. There is a name index and a subject index.

SOCIETY FOR TECHNICAL COMMUNICATION. Proceedings of the 23rd International Technical Communication Conference, Washington, DC, May 12–15, 1976. Washington, DC, the Society, 1976. 372 pp. illus. (ISBN 0 914548 20 4.)

This conference proceedings contains over a hundred short papers. The three main divisions are: editing, management and graphics. The first section includes material on training for technical editing, how to write, dealing with the engineer, technical transfer and the possible effect of machines. The management section includes papers on: actual journals (*e.g.* the *IBM Journal of Research and Development*), case studies, how to measure the performance of your publications manager, technical information publication and automated text and word processing. The graphics section discusses: self-instructional systems at low cost, script-writing for technical education, graphic communication in general and the possible computer applications.

CLAIR, COLIN. A history of European printing. London, Academic Press, 1976. 526 pp. illus. £12.00. (ISBN 0 12 174850 2.)

This survey covers European printing from its beginning to the present day. Place names in the text are printed in heavy type making identification of a particular area easy for the reader. The arrangement is chronological by century, relevant areas are covered inside these divisions. A large proportion of space is devoted to printing in the fifteenth and sixteenth centuries since this was the time when printing was overcoming technical difficulties. The first appendix gives details of the establishment of early presses in Europe in the fifteenth century and the second shows when and where the first books were printed.

ROBERTS, N. *ed.* Use of social sciences literature. London, Butterworths, 1977. 326 pp. £10.00. (ISBN 0 408 10602 6.)

During the last decade there has been increasing concern over the state of bibliographical and information services in the social sciences. This has led to a considerable increase in the number, variety of formats and availability of such facilities, both manual and computerized. Confusion has resulted and this book is presented as a survival guide for users and suppliers of these services.

In order to create such a guide, the editor has brought together a number of librarians and practitioners in different fields. Each was presented with a brief to discuss what he considers to be the major information sources and the main information problems in his area, or else to suggest how the available services can best be exploited. Not surprisingly, this approach highlights the gap between the attitudes of suppliers (such as librarians) and users.

Despite its title, the book does not cover all the social sciences (it deals primarily with economics, politics, sociology, criminology and public administration) but it does, however, also cover such fields as management, education and environmental planning. There are also articles dealing with the use of data archives, journals, official publications and the publications of international organizations. Unfortunately, however, although some of these subjects have been covered by other volumes in the same series there is no obvious link between this book and the others. While some chapters of this guide give very useful outlines of what is available in a particular field, others are in the form of lists of sources and could prove a little confusing. Also, the brevity of the index will reduce its value as a reference source. Nevertheless, this book provides a valuable guide to the use of the literature of the social sciences and brings together material which it would otherwise be difficult to locate.

R. Adam

WEAST, R. C. *ed.* Handbook of chemistry and physics. 57th ed. CRC Press, 1976. $39.95. (ISBN 0 87819 456 8.)

The 57th edition of this well-established reference tool, covering a wide range of physical and chemical constants, continues to be one of the essential single volumes required in any chemical or physical laboratory. For some time the handbook has been published annually and this edition adopts the familiar subject arrangement of mathematical tables; elements and inorganic compounds; organic compounds; general chemical; general physical constants; miscellaneous. In addition there is a detailed subject index. The arrangement reflects the consideration that has been taken in the past of suggestions from users and the editor welcomes continuation of this practice.

THORPE, F. *ed.* International index to film periodicals 1975: an annotated guide. London, St James Press. 511 pp. £12.50. (ISBN 0 900997 34 6.)

Published annually since 1972 under the auspices of the International Federation of Film Archives, the *International Index to Film Periodicals* is a detailed and comprehensive guide to the articles that appeared during the year in 79 of the world's most important film periodicals. Sources include the leading publications of the USSR, Eastern Europe and Latin America.

The subject sections which divide the *Index* cover such areas as Film Industry: Economics and Production, Society and Cinema, History of the Cinema, etc., each being further subdivided to group material on specific aspects or themes (Promotion, Law, Audiences, Psychological effects of films, etc.). The bulk of the *Index* consists of section IX on Individual Films, arranged alphabetically by original title, and including uncompleted films and unrealized projects and scripts of films not yet released. Further sections cover film biography and miscellaneous works on mass-communication and the media in general. Adequate cross-references cover co-productions and films with more than one title.

Each entry includes author and title, full bibliographic details of the periodical, additional information on the inclusion of statistics, filmography, illustrations, etc., where relevant, the nature of each item (article, review, interview, festival report, etc.) and a short annotation. Author, director and subject indexes are uncomplicated and easy to use. The *Index* is available from St James Press Ltd, 3 Percy Street, London W1P 0EJ (price: £12.50), or St Martins Press Inc., 175 5th Avenue, New York, NY 10010. (price: $30).

The published *Index* can be updated by the continuing card service from which each annual volume is compiled and which is itself available to all interested archives, libraries, institutions and individuals. The cards, numbering about 10,000 per year, are standard 3″ × 5″, issued ready for immediate interfiling and use. Enquiries concerning the card service should be addressed: FIAF, International Index to Film Periodicals, 90–94 Shaftesbury Avenue, London W1V 7DH.

JACKSON, S. L. *and others, ed.* A century of service: librarianship in the United States and Canada. Chicago, American Library Association, 1976. 354 pp. (ISBN 0 8389 0220 0.)

These essays fall into four sections: service to specific groups; major questions of professional personnel; the relation of library functions to technological advances; the environment of the profession as a whole, its relations with others and its internal developments. Each essay begins with what was happening in 1876 and goes on to chronicle any landmarks, victories or frustrations in the 100 year period. The first section includes service to the urban rank and file, to urban children, to ethnic minorities, to academia and special clienteles. The library functions which are discussed in relation to technological advances are bibliographical and reference services; library buildings are also discussed. The last section includes papers on the national libraries of the USA and Canada, the principal library associations, the library world and the book trade, librarianship's image in the media and services to library life abroad.

PEMBERTON, J. E. Politics and public libraries in England and Wales 1850–1970. London, Library Association, 1977. 149 pp. £4.50 (£3.60 to LA members). (ISBN 0 85365 109 4.)

This book aims to describe and analyse the political forces surrounding public library legislation for England and Wales. It surveys the legislative history of the public library service since 1850 against the background of local government development in general. It examines the agitation for reform which arose in the 1920s and traces the movement's successive stages and explains its failures. The contributions of the various categories of participants in the process of shaping public policy for librarians are analysed. The effects of the Public Libraries and Museums Act of 1964 are assessed in terms of central and local government relations and the machinery of public policy-making.

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8. On-line Information retrieval 1965/1976

On-line bibliographic information retrieval ('instant information') is one of the most important growth areas in library/information science and with a background of over 10 years active world-wide development the literature of the field is now very extensive and widely scattered. A timely 130-page bibliography, with indexes, compiled by James L. Hall (UKAEA Culham Laboratory) gives details of over 900 journal articles, conference papers, reports and other documents produced during the period 1965-1976.

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The list of on-line systems details 108 systems/installations developed during the last 10 years; over 60 of these are in fact currently operational. Each system entry gives full name/acronym, postal address, brief outline description and relevant literature references.

Aimed at everyone with an interest, whether recent or long-standing, in on-line bibliographic information retrieval, Aslib Bibliography No. 8 "On-Line Information Retrieval, 1965-1976: A Bibliography with a Guide to On-Line Data Bases and Systems" has just been published.

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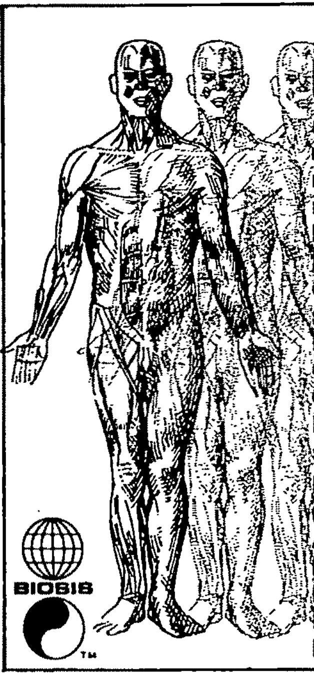

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25 SEP 1978

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Reprinted by Express Litho Service (Oxford)

ISSN 0001 253X

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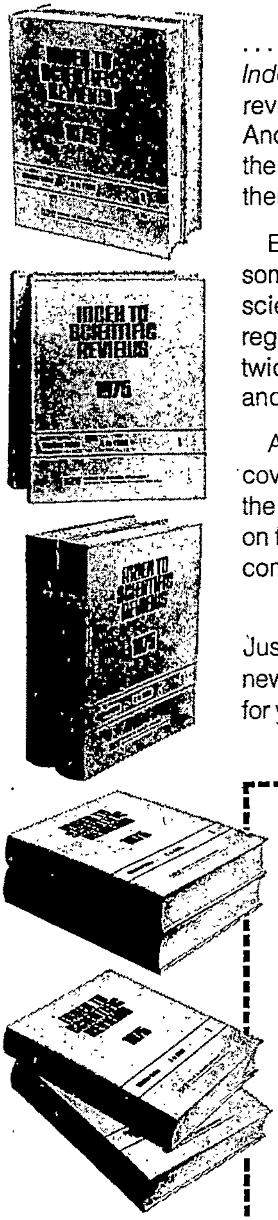

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Aslib Proceedings

VOLUME 29 AUGUST 1977 NUMBER 8

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Aslib Proceedings *is published monthly and supplied free to members of Aslib. Annual subscription: UK, £22.00; Overseas, £27.00; North America, $65.00, additional copies to members, £11.00 ($30.00). Single copies UK, £2.00; Overseas, £2.50; North America, $6.00; members, £1.10 ($3.30).*

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Notes for contributors

Aslib Proceedings now accepts contributed papers in addition to those presented at Aslib meetings and conferences. They should be of a practical nature and of some relevance to problems encountered in the everyday operation of library and information units, or services. Other kinds of contribution which will be considered for inclusion are short notes on new information units or special libraries; the introduction of new techniques or systems in existing libraries where these may be of general interest; equipment designed by members for special purposes and put into operation in their own organizations; and objective reports on experience with new 'packaged' commercially available information services.

Contributions, which should be typewritten, double spaced, single-sided on A4 paper, and not more than 3,000 words in length, should be addressed to the Editor, *Aslib Proceedings*, 3 Belgrave Square, London SW1X 8PL. If possible, authors should include a summary of up to 200 words with the typescript. Authors will receive twenty-five offprints of their article free of charge.

The dissemination and preservation of information

Lord Donaldson

Minister for the Arts

Paper presented as the 10th Aslib Annual Lecture at The Royal Institution, London, 16th June 1977

OURS IS AN age of specialization. Indeed, if it were not, many of the achievements of the human race would simply not have come about. In most fields of human endeavour—science, technology, art, recreation—progress is made by the intelligent division of labour and by concentrating on doing a few things superlatively well. If the specialist is not the hero of our times, he is at least its symbol. He claims the privileges of the expert—that those who do not have his expertise should acknowledge it, accept it, and, within his field, subordinate their own judgment to his.

But there remain large areas where the specialist has not yet established his ascendancy—and perhaps never will. In human relations, in education, in politics, the layman continues to have a say, and often to have the last word. As our institutions have become more democratic, and our people better educated, the role of the expert has been increasingly under attack. The value of pure knowledge is being questioned. There is a new school of anti-scientists, who use some of the basic concepts of science to attack its relevance and value of our society.

I am not an expert. I do of course claim a fair amount of knowledge on many subjects. But I am a generalist, and content to address you today in that capacity. Let me say straight away that I have not come to attack you for being experts, or for representing expertise. I have come rather to hold up a mirror, in the hope that the reflection may give you some idea of how others see your position, your claims and your work. An invitation to self-examination if you like. There is no need for anyone to beat their breasts in public.

Librarians are specialists by virtue of their calling. But among librarians the members of Aslib represent a yet more refined and thorough going specialism which finds expression in work of a highly complex and esoteric character, often in language unintelligible to all but the initiated. I think it is fair for an outsider to ask how all this mysterious activity is fully justified. At any rate I propose to ask the question today.

I am perfectly happy to accept that your activity is indeed fully justified in those cases where it is conducted on strictly commercial lines, where freely choosing customers are ready to meet the full cost of the services provided. But much of your members' work is subsidized, directly or indirectly, wholly or

Aslib Proceedings, 29 (8), August 1977; p. 272–278. Printed in Great Britain

in part, by the generality of your fellow citizens who contribute as tax payers or rate payers. Can I give *them* an equally clear-cut answer?

Looking at the matter in the most general way there is certainly an argument that it is intrinsically a good thing to collate knowledge compendiously, to disseminate it for present use and to store it for posterity. This argument obviously applies to scientific information. The progress of science depends to a considerable extent on the ready availability of the results of all research.

Nor should we underrate the archival function of your members' work. Much knowledge that is relatively unexciting to us now, or may have little practical application at present, will come into its own in the future as a record of our times. Your members are thus playing an important part in the much wider process of preserving the past. You are safeguarding the raw material of history. A variety of institutions are engaged on this task, and not all of them will necessarily be directly associated with Aslib. There is the Public Record Office, the British Library, the other great libraries, academic and non-academic. I would like to pause for a moment and look at the whole question of archives. In the British Library we have total preservation of the written word. But what about the spoken word? Hansard records Parliament; the BBC stores, I think, a great deal, at least for a time, of its output; the BIRS has an incomplete but enormously growing collection of all music programmes; the BFI has an incomplete but also rapidly growing collection of films, at last, I am glad to say, housed safely, which cost me a lot of money, and so has the Imperial War Museum. Museums, indeed, are themselves archives and their archival aspect is perhaps most clearly seen in the ethnographical collections and the industrial history and folk collections. We have, for example, a wonderful railway archive at the Railway Museum, various car archives, one in Coventry which I have seen, a coalmine shaft and the old pit wagons at Beamish, extensive collections of industrial and maritime machinery, an almost complete archive of shoes at Northampton and of costume at Bath. The huge accumulation of objects in our six or seven hundred museums is in itself an archive, though perhaps not sufficiently up to date in its cataloguing for the searcher after particular information, but here we are helping with the IRGMA (Information Retrieval Group of the Museums Association) studies. The difference between museums and galleries and archives proper is that the former have a duty to display, while your duty is only to file and make available.

Then there is the problem of oral history, which is difficult to define but includes, I suppose, a record of what the casual observer thought and said at the time. The BIRS is already working on this and their archives will extend in this direction as well as in music. Some of these archives have had to be selective, usually through lack of money. Some, like the written word, are pretty well complete and are maintained with completeness. But before I took on this job I never knew that the Minister for the Arts was so vitally concerned with the collection of information of all kinds. And it is because this is your chief concern that I have come here this evening.

These two complementary tasks, the dissemination of knowledge and the preservation of our intellectual and cultural heritage, are to a large extent discharged by public bodies and involve the employment of national resources in the public sector. So one can legitimately ask whether the task that we are setting ourselves is appropriate to our resources. Manifestly not all knowledge is equally useful. Nor can the whole of the past be preserved. The country cannot be turned either into a gigantic library or a gargantuan museum. Someone has to exercise selection. In the first place this is a job for the expert, not least the members of Aslib.

You are acknowledged specialists in the task of reducing to order and making available when required apparently incomprehensible masses of material. As was recognized by the then President of the Board of Trade when he contributed to the proceedings of your first conference, 'a considerable proportion of accumulated knowledge, whether in the domain of science, business, sociology, education or elsewhere, is unfortunately lying dormant and untapped.'

These words come from the relatively distant past in terms of handling of information—1924—though well within my own memory. I was at school at the time and since that time we have seen what has been called an 'information explosion', though some of the fears expressed a decade ago about its ultimate extent have not in fact been realized. The truth is, as all of you who are scientists will accept, that explosions are only as great as there is fuel to feed them, and the information explosion which we have experienced since the Hitler war has shown itself no less dependent on the fuel of the world's resources than any other explosion.

In a paper produced for OECD in 1973, Dr Georges Anderla estimated that by 1986 six or seven times the current volume of new information would be produced and that the stock of information-knowledge would be about 120–140 million documents of widely varying types, though predominantly in microform. He concluded that the 'information explosion' should be expected to continue at an annual rate of some 12.5 per cent. However, research published last year by the British Library under the title *The Growth of Literature and its Implications for Library Storage* made it clear that the rate of expansion was unlikely to reach Dr Anderla's guess. Although the number of serials (and their average subscription costs) have increased, the average number of pages of journals has remained roughly constant, and during the 1970s production of monographs has steadily decreased.

Moreover the question of how many resources should be devoted to the sifting, ordering and dissemination of information is largely one which the lay public, through its elected or nominated representatives, must resolve. The representatives, such as myself, must listen to the experts on this, but we must form our own judgment. I and my colleagues have to strike a balance between the generation of culture and its preservation. In the past we almost certainly have not paid enough attention to conservation of the cultural heritage capable and worthy of preservation. But such are the habits of society that by the very act of putting these shortcomings right we generate new problems, namely the escalating costs and obligations of conservation of all kinds. We use the term national heritage loosely to describe that part of this past achievement with which we as individuals are most keenly interested. Those interested in architecture think of houses and public buildings and churches; those in works of art think of pictures and furniture; those interested in books, literature, documents and the results of research have their own views on what this national heritage constitutes.

The complexity of this task varies from field to field: at least there is nothing intellectually baffling about preserving all the works by Italian masters or eighteenth-century composers in this country. The amount of surviving work in this class is limited. It is more or less a straight question of how much one is ready to spend. One begins to be more troubled intellectually in your own field when one contemplates the numbers of scientific papers or doctoral theses which are annually published. In this field value judgments, even among experts, become more difficult. Moreover there is a much greater obsolescence factor. Many of the great advances in science represent, if not a quantum jump, at least a considerable leap forward, often resulting from some person of talent or genius making a connection between different fields which had previously been thought to have no relevance to each other. Such a connection is too much a matter of intuition or creative imagination or chance to be capable of being systematically fostered by scattering research papers among all those who might or might not profit from them. And once such a big leap forward has been made, much of the previously assembled knowledge may be overtaken. It has little or no future use for scientists and becomes at best a by-way for the historian of science.

Indeed in deciding how many resources can be made available, a balance has to be struck between dissemination of information for current use and the archival function. The community has to ask itself: how much of our national resources can be devoted to preserving the past, when we also have to consider the generation and dissemination of new culture and new knowledge in the present?

In the harsh world of government finance and public support there are limits to the total resources available and there has to be a balance drawn between the preservation of the past and the encouragement of the present.

It may be objected that this is an over-facile analysis: the possibilities of maintaining the culture of the present depend upon its capacity effectively to use the heritage of the past. It will be argued that it is woefully shortsighted to regard the archivist and the information scientist as competitors for resources with the original artist or author or composer or researcher. In the long term this is at least partly true: the generation of new culture depends on its nourishment from the past. But this does not get us away from the practical problems of the present: that it costs money to buy and maintain historic houses; to build new national libraries; to extend our already magnificently developed public library system; to prevent works of art from being sent abroad—money which otherwise would be available for grants and other support to artists of the present day. Hence there is an obligation on us all to try to discover, within the amount of money which can be found for cultural and scientific affairs *in toto*, where the best results lie.

In drawing up this balance, we have to pay great attention to the possibilities of doing essential jobs more efficiently and with fewer resources and thus to make room for that necessary margin of new developments without which any policy for intellectual achievement would be null and void. Hence I am drawn to your own activities to see how far they can demonstrate how the apparently insuperable tasks of documenting and exploiting the 'information explosion' can be achieved without demanding so many resources as to prejudice the case for the very thing itself. All of you will remember the savant of André Maurois who was finally extinguished by the weight of his filing cabinet containing his notes. No one can be engaged in any intellectual activity without frequent reminders that he may have overlooked some essential, or apparently essential, communication in a Japanese or a South American journal. So the peace of mind both of Ministers of the Crown and of most of the world's 'experts' is dependent on the success of the information assembly and retrieval systems which information scientists can devise.

I confess not to be impressed by the number of accessions, the numbers of journals collected or the extra mileage of shelf space which I am called upon to finance. All of this may be a disagreeable necessity but it is not even a necessity unless the means are devised whereby to retrieve this information and to use it when it is needed. It is not enough for a few who have given their lives to corners of the world's knowledge to be able to say that they are abreast and can find the answer; we shall have failed unless everyone in responsible positions with the duty of taking decisions which involve the most accurate information available can retrieve this information within the time that their own decision-making processes allow.

In my area of responsibility, at a practical level, the public library service plays a part through the provision of commercial and technical libraries in major industrial centres and through the organization of co-operative schemes, such as The Bradford Scientific Technical and Commercial Services and the Liverpool and District Scientific, Industrial and Research Library Advisory Council, of which there are now some 28 in England. The role of the British Library, especially the lending library at Boston Spa as a primary source of journal articles in particular, needs no comment from me. When I visited Boston Spa a few weeks ago I was greatly impressed to see how efficiently the 10,000 or 12,000 daily requests for information were met.

I look with admiration on many of the plans that are being pursued in your field and in others to achieve this. I believe that I am seized of the importance, for example, of your microfilm service, and the development of computerized data bases. I am told, for example, that such developments in the United States have resulted in the increase of enquiries by a factor of ten in the last three years. At the international level, I understand that plans for EURONET are well advanced. As you may know, EURONET is being implemented by the Economic Community with three main aims:

(a) to provide the user anywhere in the Community via screen or typewriter with direct access to scientific, technical and socio-economic data

(b) to integrate existing and future on-line information services in the Community into a commonly shared network on a co-operative basis

(c) to make available for the first time a large variety of services operated on widely differing host computers in many different countries, via one single network.

The operational starting date will be announced in due course, but it is expected that by the middle of next year there will be around 100 data bases on-line throughout Europe. What I would like to be assured of is something of the effectiveness of these developments: how they represent new practical facilities both to the researcher and the man of action: how much they cost not in gross terms but in relation to the number of enquiries handled.

It seems to me unreal to expect those engaged in the practical decision taking to be thoroughly seized of the value of these new developments unless the case for these new systems can be developed in such terms: and it will certainly be much easier for Ministers to argue for greater resources if they too see results set out in this way.

It might be instructive to enquire whether there is a means of measuring the effectiveness of information services, even in terms of the net cost per enquiry. I shall shortly have to argue with my colleagues for the resources needed to start the new British Library at Euston in 1979–80. As all of you will know the Reference library is at the moment, and has indeed been for a long time now, suffering from acute overcrowding and shortage of space—for books, for readers and for staff. I hope to show my colleagues that with the provision of adequate space in the new Library, readers will no longer be subject to long delays in getting the books they have to order, that many more books than now will be available to them on open access, and that the serious problems currently facing the library staff in coping with the increased numbers wishing to make use of the Library's facilities will be considerably eased. But my task would be immensely helped if I could show how the new facilities will raise the efficiency of information services in terms of cost effectiveness. Perhaps I shall be told that work on this has been already done: in which case I will study the answers with deep interest.

I know that some of you wish that managers in all fields would place a higher priority on information assembly and retrieval systems. But is your case as good as that of the many organizations who daily besiege the decision takers? Where are your proofs of cost-effectiveness, whether or not in glossy technicoloured brochures? It is all too easy for the decision takers to see the immediate costs of the new equipment which is required. How can their new improved efficiency be equally clear?

In seeking to convince managers, you need to consider not only the cost-effectiveness of new procedures as against their predecessors, but also the influence of better information services on the quality of decision making. This, of course, is a much more difficult field. We all feel perhaps that improved information services improve the quality of decision making but is improved quality measurable, or can it at least be demonstrated convincingly? And if it can be demonstrated, is the benefit infinite or is there an optimum point beyond which further improvement in information services is not justifiable, and if the latter is the case, how can we assess when that point has been reached?

Finally, a word about the ultimate future of all information systems. One has policies for accession: but where are the policies for rejection? Are we committed to an infinity of expansion? Is there no death rate, only a birth rate? In the field of public libraries, with which I am more familiar, the librarian knows that he is the servant of his readers. He provides what they want, not what he thinks they ought to have. Is not the information scientist in the same position? Granted that his customers may need a little elementary enlightenment at the start, but finally, ought not the information scientist to heed their desires no less than the public librarian heeds those of his readers? If material is not used, the question must arise about whether the nation can afford to store it. Magnetic tapes fade and print through; nitrate film deliquesces and becomes explosive; the printed paper falls apart under the influence of bleach and manuscripts decay. We have to spare some thought to the problems of our successors; where are our policies in this field? What should we keep and for how long? When is information useless? Information is part of our heritage and in considering what should be preserved we cannot take a solely utilitarian view. Perhaps there is a need, therefore, to develop some generally accepted common criteria by which to assess whether material should be preserved or destroyed; perhaps a need also to develop a system to ensure that a series of independent decisions according to such criteria cannot lead to the destruction of every copy of an item when one at least should have been preserved. And if only a limited number of copies of an item are to be preserved, where can this best be done? If your proceedings throw some light on this side of information policy, you will have done a service not only to your own specialist fraternity, but to the lay public whom, I know, you wish to serve to the best of your very considerable ability.

A co-operative study of sources of information used by the motor industry

M. S. Robinson

Motor Industry Research Association

AMONG THE OBJECTS of the Motor Industry Information Group, founded in 1968 and currently numbering some 45 members, mainly from information units in the motor and associated industries, was the promotion of group projects whose results would be of direct value either to the information departments of members or to the industry as a whole. In this way, a newsletter is issued regularly, lists of books, journals and statistical publications and a thesaurus of automobile engineering terms have been prepared, and the personal contacts generated by the function of a group as a forum have unquestionably improved the effectiveness of the information services of its members.

Method of study

A proposal was made in 1974 that the members of the Group should combine to produce a survey showing what types of publication were most widely used by their information services. Surveys of this type covering a wide spectrum of industry or individual organizations are not uncommon, but surveys covering a fairly narrow cross-section of industry and quantifying the data have not often been carried out. After some discussion at MIIG committee meetings, it was decided that the survey would be of most value if the results were to specify the individual publications, rather than types of publication most used to answer specific types of enquiry. The questionnaire used to elicit this information was therefore necessarily complex, consisting of a grid with a vertical scale composed of subject fields and a horizontal scale of different aspects of a subject (technical discussion, technical data, economic, legal, standards, environmental, etc.) The titles of publications most frequently used as sources of information on particular subjects and aspects thereof were written in the squares thus formed. To avoid ambiguity as far as possible, the type and form of information on individual aspects were defined and well-known publications which might be used by respondents were given code numbers to avoid the time and space-consuming process of writing in the titles of these publications. Besides this main question, other questions were included which were intended to provide information on the subject interests of respondents, the scale of their information activities and the types of outside sources of information used by them to obtain literature both when the reference was known and where this was not known, i.e. a subject search was required.

Some doubt had been expressed whether respondents would be deterred by the complexity of the questionnaire. In the event, 21 questionnaires were returned out of 47 sent out, a creditable response. The numerical distribution of

Aslib Proceedings, 29 (8), August 1977, p. 279–283. Printed in Great Britain

types of respondent approximated not unreasonably to that existing within the industry at 2 from vehicle manufacturers, 11 from engine and component manufacturers and 2 from firms associated with the petroleum industry. Six replies were received from non-manufacturing organizations. The interests covered by respondents included engineering (19 claimants); manufacturing (12); materials (14); economics and marketing (16); standards (15); environmental (13) and legal (6). The last figure might be thought surprising in view of the importance of legislation in most of the activities of the industry, but may perhaps be attributed to the tendency for the collection and dissemination of information on regulations, etc., to be entrusted to a specialized legal department rather than an information unit or library.

Current-awareness bulletins were prepared by 11 respondents, lists of recent additions by 9 and abstracts journals by 7, with 5 of each type circulated externally as well as within the organization.

Analysis

Of the two main questions put to participants, the first was intended to determine what types of information unit outside the respondent's organization were most used to trace literature: (a) identified by reference and (b) not identified by reference, generally implying some form of subject search. Respondents were asked to rate on a scale of choices (choice 1, choice 2, etc) a number of different types of information unit. The numbers indicating the choice for each of these types of information unit under conditions (a) and (b) were added to produce the following 'scores' (low scores indicating high preference) as follows:

Type of Information Unit	*Condition*	
	(a)	(b)
Public Library	87	79
University Library	114	89
Research Association	63	33
Other Special Library	73	54
Local Cooperative Scheme	113	92
Subject Cooperative Scheme	111	72
Subscription Library	146	120
British Library	38	111
Other Source	128	88
	BL nominated first choice by 12/19 respondents	RAs nominated first choice by 9/17 respondents

TABLE 1: *Type of information unit*

The results clearly show the reliance placed on the British Library as a source of defined references and on Research Associations for 'problem' references and subject searches. The overall use of Research Associations as a source of information indicates the importance of these sometimes underrated units.

For the main question, respondents were invited to specify the publications most used by them in tracing information on motor vehicles, aspects of their operation, engines and other components, fuels, lubricants, other chemical products and materials, totalling 46 subjects, from the following aspects: technical discussion, technical data, management, production, economic and marketing, standards and legal, and social/environmental. As mentioned previously, definitions and code numbers for well known publications were given.

The results of this question, completed by 17 respondents, are summarized in Table 2 (see pages 282 and 283) showing the number of times particular publications were mentioned in connection with subjects and their various aspects:

Analysis of the data indicates that:

1. Among technical discussions (normal technical/research papers, conference proceedings, etc.) the use made of SAE and Institution of Mechanical Engineers papers is well above that made of any other source (243 mentions), followed by *MIRA Abstracts* (162 mentions) and *ASME papers* (65). Since the ratio of SAE papers on automobile engineering to I.Mech.E. papers on the subject is in the region 20–30:1, it can reasonably be assumed that SAE Papers represent the most important single source of information in this group of publications. Among sources of information in particular areas, *Exhaust Gas Air Pollution Abstracts* received 12 mentions in connection with vehicle exhaust emissions, followed by SAE/I.Mech.E. Papers (7) and *MIRA Abstracts* (5). Sources particularly mentioned in the area of vehicle safety were SAE and I.Mech.E. (18), *MIRA Abstracts* (16); the next most frequently quoted source received 4 mentions. Under noise, SAE/I.Mech.E. papers and *MIRA Abstracts* received 8 and 6 mentions respectively, followed by ASME and FISITA papers with 3 mentions each.
2. The general absence of any great reliance on foreign-language publications is reflected in the virtual absence of mentions of such excellent journals as the *ETAI series Revue Technique Automobile*, *Revue Technique Diesel*, *Revue Technique Carrosserie* and *Revue Moto Technique* as sources of technical data. Most respondents employed workshop manuals for this purpose (22 mentions) followed by *Palgrave's Technical Service Data* or equivalents (17), the *World Car Catalogue* and equivalent commercial-vehicle data such as *Internationaler Nutzfahrzeugkatalog* (12) and trade literature (10).
3. *Financial Times* was almost the sole source quoted for management information (59 mentions).
4. Few sources of production-engineering information were mentioned, the most-quoted, *Automotive Industries*, being mentioned only 4 times.
5. Sources of economic information again followed a fairly well-agreed pattern, with *Motor Industry of Great Britain* receiving 31 mentions, *Financial Times* 12, *Business Monitor* 8, and *Motor Business* 6. Among sources of information on petroleum products, the Associated Octel publication *Information about the Oil Industry* received 4 mentions.
6. Not unnaturally, British Standards received most mentions in the field of standards (58) followed by SAE and DIN standards (33 each).

Subject	*Technical Discussion*	*Technical Data*	*Management*
Motor Vehicles and Aspects of Operation (Ride and Handling, Ergonomics, Safety, Energy Conservation, Noise, Exhaust Emissions, Reliability)	*SAE/I Mech. E. Papers* (51) *MIRA Abstracts* (32) *ASME Papers* (13) *FISITA Congr. Papers* (9) *Exhaust Gas Air Poll. Abstr.* (8) *Brit. Technol. Index* (6)	*World Car Cat.* *Internat CV Cat.* (12) *Tech. Service Data* (10) Workshop Manuals (3)	*Fin. Times* (22) Several others 1 each
Vehicle Components (Engines, Engine Components, Chassis, Body, Transmission, Electrical and Misc. Components)	*SAE/I Mech. E Papers* (160) *MIRA Abstracts* (106) *ASME Papers* (36) *FISITA Congr. Papers* (27) *Exhaust Gas Air Poll. Abstr.* (6) *Automot. Des. Engng.* (now *Automot. Eng.* (6) *ATZ/MTZ* (4)	Workshop Manuals (19) Trade Lit. (10) Tech. Service Data (7) *MIRA Abstracts* (5) *SAE/I Mech. E.* (4)	*Fin. Times* (25) *Dot* statistics (3) *Battery Man* (1) (electric vehicles) No others
Fuels, Lubricants, Other Chemicals	*SAE/I Mech. E. Papers* (23) *MIRA Abstracts* (18) *ASME Papers* (8) *FISITA Congr. Papers* (7) *Exhaust Gas Air Poll. Abstr.* (4)	*Spiers-Tech. Data on Fuel* (7) *SAE/I Mech. E.* (3) Several others 1 each	*Fin. Times* (7)
Materials Metals	*SAE/I Mech. E Papers* *ASME Papers* (5) *Brit. Technol. Index* *Engng. Index* *MIRA Abstracts* (4) *BNF Abstracts* *Lead Dev. Assoc* (3) *BCIRAJ* *ASM Met. Hdbk.* (2)	*Machinery's Handbook* (5) *Waldman-Engng. Alloys* (4) 5 others 1 each	*Fin. Times* (2)
Non-Metals	*SAE/I Mech. E.* (4) *RAPRA Abstracts* *ASME Papers* (3) *Brit. Technol. Index* *Engng. Index* *MIRA Abstracts* (2)	*Machinerys Handbook* *Condensed Chem. Dict.* *Kirk-Othmer- Dict. Chem. Technol.* *Mod. Plast. Encyclopedia* (1)	*Fin. Times* (1)

7. The most commonly-used source of legal information was the *Intereurope* service (56 mentions). The publications of the *Society of Motor Manufacturers and Traders*, one of which, the *Summary of International Vehicle Legislation*, had only recently begun to appear when the questionnaire was circulated received 37 mentions, and those of *Automobile Importers of America* which, though very complete, are issued only to a restricted membership, are confined to USA, and are very expensive (£3000 quoted to the author's organization for Associate Membership), 25 mentions.
8. Publications of the Transport and Road Research Laboratory received 44 mentions as sources of social and environmental information, followed by OECD (39), *Exhaust Gas Air Pollution Abstracts* (18) and other government publications (15).

Results

● The results, from a reasonable sample of information units from the motor and associated industries, show generally close agreement on the organizations most widely used as sources of literature and information, and on the publications most frequently consulted in response to enquiries. As sources of literature, the reliance placed on the British Library and Research Associations has been shown. The survey of publications used by respondents has shown the importance of Society of Automotive Engineers documents; the difficulties and delays widely experienced in the past in obtaining these have been largely eliminated

Production		*Economics, Marketing*		*Standards, Legal*		*Social Environmental*	
				i/Stds.			
Automot. Inds.	(2)	*Mot. Ind. GB*	(23)	BSS	(25)	TRRL	(29)
Prod. Engr.	(1)	*Busin. Monit.*	(5)	SAE	(14)	OECD	(21)
		Mot. Busin.	(2)	DIN	(12)	Other govt.	(11)
		16 others 1 each		Others, incl. ISO, IEC, 1 each		*Exhaust Gas Air Poll. Abstr.*	(9)
						MIRA Abstracts	(4)
				ii/ Legal			
				Intereurope	(22)		
				SMMT	(19)		
				AIA	(10)		
				i/Stds.			
MIRA Abstracts	(2)	*Mot. Ind. GB*	(8)	BSS	(20)	TRRL	(15)
Busin. Monit.	(2)	*Mot. Busin* *Fin. Times*	(4)	SAE	(13)	OECD	(10)
		Busin. Monit.	(3)	DIN IEC ISO Manufacturers specs	(1)	*Exh. Gas Air Poll. Abstracts*	(9)
						MIRA Abstracts	(8)
				ii/Legal			
				Intereurope	(34)		
				SMMT	(18)		
				AIA	(15)		
				Automot. News	(5)		
				Europ. Tyre Rim Tech. Assoc.	(2)		
				i Stds.			
Petrol. Rev. *Petrol. Times* *Fin. Times*	(1)	*Fin. Times*	(7)	SAE	(4)	OECD	(8)
		Inform. about the Oil Industry	(4)	Inst. Petrol. BG DIN Min. of Def	(2)	Other govt.	(4)
		Inst. Petrol statistics	(2)				
		Others 1 each					
				i Stds.			
Foundry Trades Journal *Metal work Prod.*	(3)	*Metal Bull. Hdbk.*	(3)	BS	(8)		
		World Metal Stat.	(2)	DIN	(5)		
		Several others 1 each		SAE	(2)		
SAE/I Mech. Eg. *Automot. Inds.* *Automot. Engr.*	(1)	*Fin. Times* *Mod. Plast.* *Europlastics*	(1)	BS	(4)		
				SAE DIN	(1)		

following the appointment of the Motor Industry Research Association as European agents holding stocks for immediate delivery of all SAE papers. The next most widely-quoted source, the Automobile Abstracts of MIRA, naturally references all SAE papers dealing with ground vehicles, and it would be interesting to ascertain whether respondents had learned of the SAE papers they use from publications issued by the Society (Journal, programmes of meetings, etc.) or from MIRA Abstracts.

- The vast majority of the publications used are in English, and, bearing in mind the wealth of information contained in foreign-language material and the general scarcity among respondents of in-house translation facilities, that the specialized translation facilities offered by Research Associations might well be more extensively used.
- The survey has shown patterns of response which might well yield points of interest on further study. A possible reason for the relative lack of interest in legal information on the part of respondents has been suggested; but why, although 12 respondents claimed interest in information on manufacturing methods, were so few mentions made of so few different publications? Other questions of this nature can arise from the results and closer examination might well yield data showing the existence of gaps in information coverage and possible action to ensure that adequate information is most effectively disseminated and used.

Merlin for the cataloguer

A. Hopkinson

British Library Bibliographic Services Division

MERLIN is the British Library's advanced computer system. A new MARC-type format has been devised to take advantage of recent developments in computer technology. Records are split up into meaningful elements which are stored separately. Catalogue entries consist of a set of pointers pointing to the elements. MERLIN supports shared cataloguing but allows libraries to have their own private views of any element or group of elements. Standardization is easier to achieve as the structure of MERLIN is designed to make use of authority files. Automatic conversion is possible between the MERLIN format and existing formats.

Introduction

MERLIN is the name given to the British Library's advanced computer system: it stands for MachinE Readable Library INformation. This name has been chosen to stress that the system will support all kinds of library information including library housekeeping information, keywords, abstracts, statistical information and indexing systems, compared with MARC which is purely a system for producing catalogue records, standing as it does for MAchine Readable Cataloguing.

MERLIN's first applications will be in areas where present systems cannot cope; first in subject classification and indexing, in PRECIS, where the advanced nature of the work requires the latest computer database technology and then in the area of cataloguing non-book materials where UK MARC, having been devised originally for books, does not have sufficient definition to deal with items which may constitute sets consisting of different types of bibliographic material. The first applications will therefore be the on-line PRECIS file and the Learning Materials Recording Study for which the British Library and the Inner London Education Authority are coming together to produce a prototype catalogue of non-book materials to explore the possibilities of a national materiography produced by cooperative cataloguing as was envisaged in the report *The Scope for automatic data processing in the British Library.*[1]

MERLIN: the bibliographic file

Although MERLIN will eventually support the whole of the British Library's computer work it is in the area of bibliographic records that other libraries will be participating; it is with this area that we are concerned here. The British Library already provides a number of services to other libraries to assist them in producing their catalogues. Libraries may purchase the records produced in the MARC (Machine Readable Cataloguing) format on magnetic tape corresponding to all the entries in the British National Bibliography; these are kept up to date by weekly tapes corresponding to the *Weekly List*[2] to which libraries can subscribe. Alternatively on receipt of a list of control numbers

Aslib Proceedings 29 (8), August 1977, p. 284–294. Printed in Great Britain

(BNB number or ISBN), a search is made of the tape files and the appropriate records are copied to a tape which is sent to the requesting library. A third service is the catalogue production service; libraries select their records by means of a control number and may also submit their own records in MARC format for foreign books or UK publications before 1950 which are not in MARC. Catalogues are then produced for these libraries in a number of different formats. Of these three services it is this last service which the new system will benefit most of all; those records which a library has to create itself will be stored on the computer in such a way that other libraries can see them. These services will continue under MERLIN and will be enhanced in the light of experience which has been gained in the computer departments of the British Library and its predecessor the British National Bibliography Ltd.

The present state of machine readable cataloguing in the British Library

The catalogue services which the British National Bibliography provided were based on the MARC system developed by the Library of Congress of the United States in 1964 and the British Library still uses this MARC format. Essentially, the MARC system involves coding each element of a catalogue entry with a three-digit code called a tag. A personal author's name as main entry is coded 100, as added entry 700; title is 245, publisher 260 and series statement 490. These codes are extended by adding indicators, numbers which denote if the title is required as an added entry or the number of non-filing characters at the beginning of a title. Each element or field of information is further divided into subfields which are coded in a different way. On this format was based the official international standard for the exchange of bibliographic records on magnetic tape ISO 2709. This specifies very broadly the requirement of the tapes for exchange. The Library of Congress is developing a number of formats to this standard, for books, serials and all other kinds of materials, but so far at the British Library we only take exchange records of books. If the British Library were to take records for other kinds of materials on tape it would be necessary for new formats to be devised as the present UK MARC format has only the fields required for cataloguing books. Thus it cannot hold data such as scale on maps very satisfactorily as there is no code set aside for scale in the MARC format. The British Library has not yet begun to use any format other than that for books, though formats for maps, music and serials have been developed. There are good reasons for this. There is a set of programs which produce catalogues from the present format. If different formats were produced, slight alterations would need to be made to the programs to enable them to deal with other tags. And if a catalogue were being produced containing records of different categories of materials, the programs would have to be switched each time a different record were being processed, a very unhappy situation. This means that MERLIN must have a common format for all types of media and materials. For this reason the idea of the MERLIN format was mooted: so that all records can be stored in one sequence in the computer and so that one output program can cope with any type of record equally well, especially as the new AACR will not be biased towards any particular type of bibliographic material.

Automation—the future

If a computer is introduced into any process it should never become its master. The format of the catalogue entry has developed over 400 years and librarians are not going to throw this overboard to suit a computer. The MARC format, though developed only recently, is well established and satisfies the requirements of most libraries which only require catalogues of books and if they have catalogues of recorded music may wish to keep them separate in any case. One of the requirements of MERLIN is that it will allow input and output by means of the UK MARC format, though it will store records by means of the MERLIN format. The cataloguer using UK MARC will put his record into MERLIN either by typing it in on a visual display unit or by means of punched card or tape. The computer will then take each record and by means of a process known as tag translation will convert the tags to the MERLIN format ready to be stored. This will be done by looking up each subfield within a field in a table and finding the corresponding one in the new format. When the record is called up again from the database it will be converted back into UK MARC automatically, as the user will have specified beforehand the conversions he requires and these will be stored in the computer. However if the record is used for producing a catalogue entry, the entry will be constructed directly from the MERLIN format. The aim is of course to produce catalogues according to AACR and ISBD in as efficient a way as possible. UK MARC will suffice for the AACR requirements of most public libraries; but for a national library catalogue or for an information retrieval system which will hold records from which are to be produced different kinds of catalogues and bibliographies a new internal format has had to be devised.

The MERLIN format

It must be remembered that the MARC format was devised for holding records on magnetic tape. In order to extract a record from magnetic tape and get it copied into a file to produce a catalogue it is usually necessary to run all the way through a large set of tapes. Each MARC record has a control number, either ISBN or BNB, and if this is known it is easier to find a record. If the date of the record's creation is known it becomes easier to find the appropriate tape but when that is found the computer has to run through the tape looking for the desired record. Advances have been made in computer technology since 1964 when the MARC format was devised and now records can be held on disk and the computer can find the appropriate point where a record is held, almost instantaneously. A disk can be pictured in the following way. Imagine a record player with not one needle and turn-table, but a set of needles all on arms above each other, each able to play a different disc. On each disc are a number of different pieces of music. Each head can point anywhere on its particular disc. This is how a computer disk works. The 'gramophone records' go round and it only takes one revolution for the heads to find the appropriate point. How they do find the appropriate place on the disk depends on complicated hardware technology, but it is just as easy for a disk to be searched for a name as for a control number, so long as they are correctly specified. Advances have also been made in telecommunications technology. In the past records had to be transferred from one organization to another on tape, magnetic tape or paper tape. Now it is possible for libraries to communicate directly with the central computer over GPO lines and the records can then be consulted on a VDU without any physical objects being moved. Faster access has interesting possibilities. Instead of storing each catalogue record in a string of characters as on a MARC tape it is better to store each element separately according to its type. This makes retrieval of any record faster in the long run and can assist in the production of catalogues as well as retrieval of individual records. Most important of all it saves space in the computer, an important factor if you want to store six million catalogue records in one computer! In fact fast retrieval makes it essential to store records in different ways and build them up from basic elements. Each element is indexed by the computer and referred to by its address or location on the computer disk. These addresses appear to be used as shorthand, or codes, for the data. Each element whether a complete record or just a field will be indexed in this way if it will be useful for retrieval. Instead of repeating the data in each record, the computer builds up a record consisting of pointers. These pointers make up what is called a packet, in this instance a work packet; there are also subject and name authority packets. Each work packet contains a pointer to every item of data contained in the record of that book. In addition each library that uses that record has a code attached to the record itself and to each item of data in the record that it uses which is different from the standard record. The standard record is that of the British Library or if none has been entered by the British Library the record input by the user

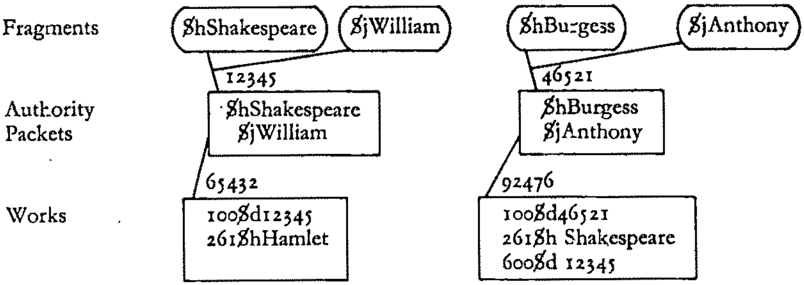

FIG. 1A: *Diagrammatic representation of works, authority packets and fragments of text on database*

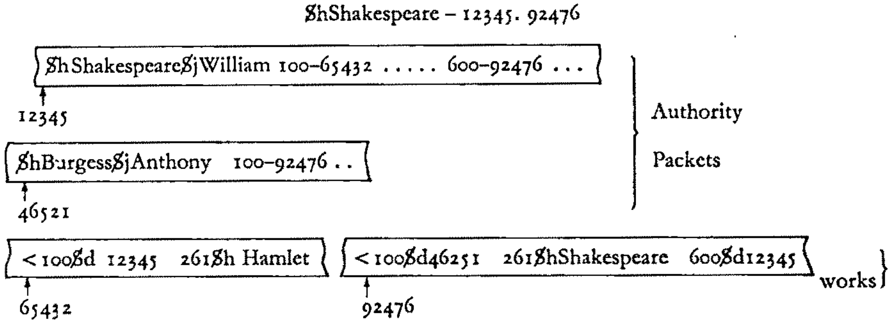
$hShakespeare – 12345. 92476
$hShakespeare$jWilliam 100–65432 ..... 600–92476 ...
12345
$hBurgess$jAnthony 100–92476 ..
46521
Authority
Packets
< 100$d 12345 261$h Hamlet
< 100$d46251 261$hShakespeare 600$d12345
works
65432
92476

FIG. 1B: *Representation of storage of Fig. 1a on database*

with the highest authority. Each user will be given an authority level relating to his use of AACR and fullness of cataloguing. So each record has associated with it a list of pointers to the data within it; also each data element equivalent to a field has a list of pointers to records that contain this element and a list of pointers to the subfields within it in certain cases. Thus if a search of the database is initiated for all books by and about William Shakespeare the computer will search its files of data for the name (in MERLIN format $hShakespeare$j William) and will then follow up the pointers which will lead to every record containing that name. The role of the name William Shakespeare in the record will be discernible by the tag which will precede the list of pointers and the computer will be able to search selectively depending on the tag. The arrangement of the data is decribed diagramatically in Figure 1a. Figure 1b shows how this will be stored in the computer. This diagram does not illustrate that a library can have its own 'view' of any item on the database. This has been left out for the sake of simplicity. If a library wants different information in a record then it will set up another pointer to its own information. It will appear to have overwritten the original information though anyone who requires the original will find it. Unfortunately each 'private view' will take up space and users of the system will have to pay for this; so it will be advantageous for libraries to adopt AACR as it is usually interpreted, or a subset of this.

Large records from smaller ones

One feature of the storage of data in a computer using the most recent database techniques is that larger records can be built up from smaller records. This is done by means of links that indicate that one item is related to another. If a library is interested in a link, then the computer will store that link and mark that link with the code of the interested library. The cataloguer will not need to know about these links; the computer will assume them from the way the cataloguer presents his information. In order to take full advantage of these links it is essential that the data is analysed in a logical way and this is where the MERLIN format differs from other formats. The MERLIN format is not completely devised yet and in fact unlike earlier formats it will be flexible and will always be changing to keep up to date with requirements. The tags are arranged to reflect the order of ISBD. However it is not the order of the tags that makes the important difference but the definitions and these will match those in the new AACR.

Quicker and easier cataloguing

Every cataloguer knows the tedium of cataloguing a large number of books in the same series each of which requires a separate entry. And the more complete the entries the greater the tedium and the amount of time wasted as the cataloguer virtually copies each entry from the previous one making only minor alterations to each one, such as part title and number, and ISBN. The cataloguer at a typewriter might be tempted to resort to carbon paper adding the differences later. The cataloguer at a computer terminal is more fortunate; he can create one record, send it down into the computer and using the same data on the screen can then replace the appropriate words by overwriting them

PHILOLOGICAL SOCIETY
Transactions of the Philological Society.—Oxford : Basil Blackwell. 1972.—1973.—114 p.; 22 cm.

FIG. 2A: *Entry for a part*

PHILOLOGICAL SOCIETY
Transactions of the Philological Society.—Oxford : Basil Blackwell, 854— .
Published in Oxford by Clarendon Press, 1854–1953.

FIG. 2B: *Entry for a serial*

PALMER, FRANK ROBERT
Noun phrase and sentence: a problem in semantics/syntax/by F. R. Palmer. (*In* Philological Society. Transactions of the Philological Society, 1972. Oxford, 1973. 22 cm. p. 20–43).

FIG. 2C: *Entry for a serial article*

with new words or spaces. He then has a new entry which he can send down into the computer. In the MERLIN system, items of information are held only once with pointers to them from the individual records. Therefore it will be helpful if the catalogue records can be divided into useful semi-independent units of data, which can be called subrecords. A MARC field with an author's name is one such kind of subrecord, but collections of fields can constitute subrecords, some of which can be brought into a large number of records of books. The text: 'Report on the census of production/ . . . Business Statistics Office—London: H.M.S.O.—(*Business Monitor*)' occurs thousands of times in MARC records. In fact some catalogues would merely require this text once and treat these Business Monitors like a serial, not noting individual parts; in fact one man's record can be another man's subrecord so we call them all records and if a set of these is brought together we call it a record set. These records will belong to different bibliographic levels. In Figure 2a we are interested in the part and so within the record we note the contents and series and concentrate on describing the part. In Figure 2b we are interested in the series as a unit and not so interested in its parts, though in an on-line cataloguing system like MERLIN it will be easy to follow up all the links to the parts. In Figure 2c we are interested in the article and describe this fully, of necessity referring to the serial and part in which it is contained. MERLIN will be able to store the whole record and offer to the user the different parts of the total record that he requires. The record which he wants to see, which will be to him a record in its own right, is called the virtual record. To make a record look complete to different users with different requirements we must analyse the records in a logical way. Whatever type of material or level a record represents, it will have a title and usually author or editor and control number, publisher and date. At any level and within any material each element of description will have the same tag. Each different record in a virtual record will have a code to determine the record type and each record will have a number between 1 and 99 prefixed by a B to denote bibliographic record (A is an authority record). In Figure 3 each record has a contained/contains relationship with the others, but more especially with the adjacent members of the record set. In addition each record can be categorized, e.g. series, part, analytical, and a code indicating the category will be found in the 001 field. The record number serves to indicate the point of the record in the hierarchy. If there were two articles in the virtual record in Figure 3., they would be labelled B9/1 and B9/2, to indicate they are at the same level. The computer will not store these level numbers but will convert them into links. Each record in Figure 3 would then contain at least one linking field. Records 3, 5 and 7 will contain two, one up and one down. These tags will be in the 700/800 range; 700 will mean contained in and 800 will mean contains. Each tag will be followed by the database number of the work record to which it links. At times it will be necessary for the cataloguer to insert the links himself. If a work is in two distinct series, then it will be clearer if the links are made explicity and it will be essential to make the links explicit if the item in hand has a volume number within one or more of the series, or if one series and not the other is contained within a third and higher series. Figure 4 illustrates this; the cataloguer has made the links only in one direction: the computer will make and store the reciprocals.

Non-hierarchic links

It is only the hierarchic links, denoting contains or contained in, that can be implied. In MERLIN other kinds of links will be available. Because of the way in which MERLIN stores records, advantage can be taken of their links to produce bibliographic history notes. The relationships denoted by MARC tag 503 can be expressed in MERLIN by actually making a link from the work in hand to its related work. Instead of writing out a note at the foot of a catalogue

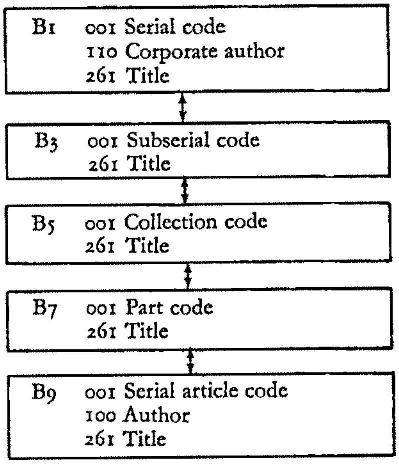

FIG. 3: *A record set illustrating an article within a part of a subserial; the part is found in a physical collection of parts bound together (e.g. an annual volume). The subserial is part of a serial*

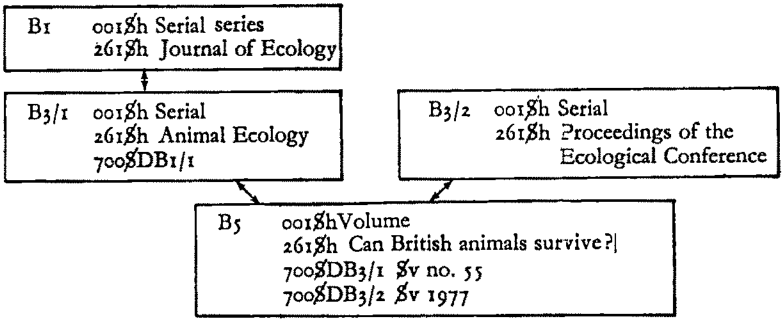

FIG. 4: *Links in two hierarchies*

entry—e.g. Originally published: 1956—we can make a link to the earlier work when we catalogue the later one. This can be made by quoting an ISBN or other suitable control number in the linking field. Alternatively if the cataloguer is working at a terminal on-line, he may conduct a search for the record he wants to link to and on displaying it on the screen he can give it a record number and add the new record to that record creating a virtual record containing both works. This search parallels the procedure in *British National Bibliography* production at the moment. If a book is found to be a new edition of an earlier work, the cataloguer searches for the entry of the previous work, either through the authority file or earlier volumes of *British National Bibliography*. On finding the entry he uses it to standardize the later entry and takes the date and publisher if it is different from the earlier work. Of course a note like the one above is not required in a catalogue where the works would file together, so this kind of link would not be followed up if the computer were producing a catalogue rather than a weekly list or even annual list of books published. Figure 5 shows an example of a virtual record containing two works, one a new edition of the other. Tag 740 means 'originally published'.

Authority file information

Name authority records will be stored in MERLIN in a similar way to work records. Separate fields will store alternative versions of the name and the references. Other fields will store notes on the authority record. Links will be made between the authority record and the first work which uses the authority

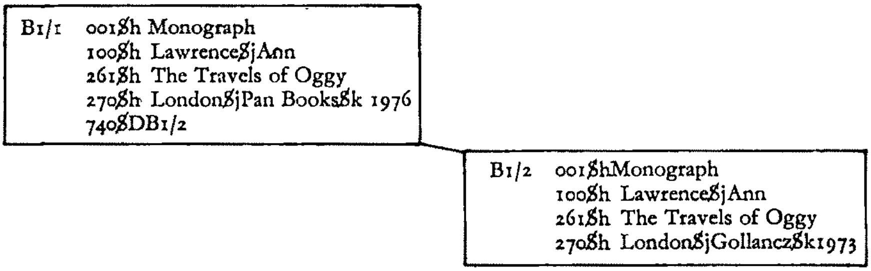
B1/1 001$h Monograph
100$h Lawrence$jAnn
261$h The Travels of Oggy
270$h London$jPan Books$k 1976
740$DB1/2
B1/2 001$hMonograph
100$h Lawrence$jAnn
261$h The Travels of Oggy
270$h London$jGollancz$k1973

FIG. 5: *A work linked to a previous edition of the work*

record. These notes and links will serve as aids to the cataloguer to enable him to make a choice between the different authority headings. Where MERLIN will differ from existing systems is that the name that is chosen as the heading in an authority record will be the very same instance of the name used in every record where it appears. This is made possible by the system of pointers. Whenever the name William Shakespeare is used, a pointer will be set to the actual one and only instance of that name on the database. If the name is changed it will be changed in all instances though there will be an overriding mechanism so that if the British Library changes a heading it will not necessarily, if so desired, result in changes in other libraries' records. Furthermore, setting a pointer to a name will result in all the references relating to that name being included in a catalogue that contains that record. Thus it is essential that each name is unique or else if one name were changed the other would be changed automatically. This is no problem as name headings have to be qualified until they become unique. Librarians are fortunate in that the high standard of their records lends themselves to this kind of automation. Once again, cataloguers may change their view of the references by inserting alternative forms in the authority record, which will be marked by their own library's code.

Using the authority file in cataloguing

The cataloguer on entering a work will be able to create a separate authority record for each author in the work record. However, creating a separate record takes time so to avoid this it will be possible for him to enter authors in the normal MARC way, at tag 100 in a record. Added entries for authors will also be at 100 (cf MARC 700) to keep all names together; an indicator will differentiate. The computer will then compare the name as entered with all the name headings in authority records and will set a pointer to the appropriate one. If there exist two headings that match (e.g. if there are two authors of that name which require date of birth to distinguish) the cataloguer will be told either instantaneously on his VDU, or on a diagnostic printout if he is working in batch mode. Ideally the cataloguer working on-line will conduct a search for the appropriate authority records, except in the case of a common well-known heading where there is no chance of a mistake. Having found the name in an authority file search, the cataloguer will be able to insert it into the record by typing in the preferred form as found in the authority record, or by typing in the control number of the authority record (called the name index number or NIN). This will ensure the inclusion of all the necessary references to that heading in the catalogue.

Content of the authority record

The information to be stored in name authority records has not yet been finalized and is awaiting the INTERMARC proposal on authority files. However, so far the requirements of different departments of the British Library have been catered for, and a paper has been written[3] and discussed at the British Library Cataloguing Policy Group. There will be the facility for storing in each authority record a note of the AACR rule which has been used in making any decision on the form of the heading, and the source of information for

0XX	Control numbers and coded information
1XX	Names
2XX	Titles
3XX	Media specific information including collation
4XX	Series statement
5XX	Notes
6XX	Subject information
7XX	Links
8XX	
9XX	Private information, e.g. shelf marks

FIG. 6: *Outline of areas in MERLIN format*

creating the heading if outside the work for which it was first created. The nature of MERLIN makes it easy to be able to call up any or all of the works in which a heading is used, without the cataloguer having to do any extra work.

Coding the data within records

Little has been said in this paper about the way the cataloguer will code the information in the records. The tags used will be similar to those in UK MARC. Extra fields have been added; many of these are required for non-book materials and have been found in the LC MARC formats for such materials. Others have been found in INTERMARC, UNIMARC and UNISIST documents and others from the requirements of the British Library and its customers. Because the format is devised with ISBD in mind the subfields do not always correspond exactly with those of the present MARC format. John Linford's paper for EUDISED[4] was taken as a model for the arrangement of the tags and the requirements of ISBD and the new edition of AACR have been largely superimposed on this, resulting in ten areas as illustrated in Figure 6.

Tag translation

Though these tags are different from the ones used at the moment, cataloguers will not need to change to the new format. Because of a powerful table-driven program in the computer it will be possible to convert automatically existing formats to the MERLIN format, in fact the MERLIN format was designed with this in view. Each user will have stored in the machine a set of profiles which tells the computer amongst other things what kind of output that user requires and what format he uses for input and the validation he requires, so the cataloguer will not need to know of this conversion. MERLIN is already preparing for international exchange of records in different formats with its flexible built-in tag translation program.

Design of MERLIN

MERLIN has been designed by computer people and librarians working together. It has been designed as a completely new system and yet it will be able to interface with existing systems.

A committee of cataloguers drawn from interested parties in the British Library, including the Bibliographic Standards Office has drawn up the format with staff from the computer team suggesting ways in which the format and the records can be handled. They have kept in close touch with the British Library Cataloguing Policy Group and ideas have been exchanged between the MERLIN team and cataloguers from other departments of the British Library. The foundations of the MERLIN system were laid on the personal experience of members of the team, the experience gained from the Library Software Package and advice from Michael Gorman and the Bibliographic Standards Office.

On the technological side, members of the team have given papers at conferences on information retrieval[5] and computer database technology,[6] and written an article in *Program*.[7]

However as a matter of policy the requirements formulated by the cataloguers have overriden ideas of the computer staff where there has been any conflict.

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The War Studies Library at King's College, London University

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Paper presented at a Social Sciences Group Evening Meeting at Aslib, 14th March 1977

Background

THOUGH LECTURES in military studies were given at King's College in the mid nineteenth century and again in the inter-war period there was virtually no library to support them and history further records that towards the end of the Second World War military studies ceased and were not revived until 1953 when a Lectureship in Military Studies was established in the King's History Department. The holder of this lectureship was Michael Howard, who has since achieved wide renown in military history and strategic studies and is at present Chichele Professor-Elect of the History of War in the University of Oxford. When he was appointed Reader in War Studies in 1961 and Professor of War Studies in 1963 the subject may be said to have finally got off the ground and in token of this it was organized as a separate Department of the College in 1961. I may add that, in common with higher education in general, the 1960s was a period of great expansion in the Department and between 1965 and 1971 four other lecturers were appointed to the staff. The growth of the War Studies Library kept pace with this expansion, for as early as 1953 when London University voted a special grant Michael Howard began to build up the Library on the surest foundations, so that as regards numbers there were approximately 2,500 volumes by the end of the 1950s and by 1977 it has grown to some 11,000.

The War Studies Department is concerned with the study of the historical, political, technical, economic and social problems which arise out of the preparation for and conduct of war, including questions of arms control and disarmament. The degrees for which it teaches are designed to be of value not only to academic specialists in defence questions and members of the Armed Forces, but as a preliminary to a career in public administration, politics, journalism and international affairs.

Teaching in War Studies in King's is organized on three levels. First, undergraduates for History Finals can offer an optional subject called 'War and Society in Modern History' and a special subject of military interest which in Professor Howard's time was the Franco-Prussian War of 1870–71, is now the Gallipoli campaign in 1915 and in two or three years' time will probably be the Second World War to the fall of France in the summer of 1940. The number of

Aslib Proceedings, 29 (8), August 1977, p. 295–301. Printed in Great Britain

undergraduates taking these courses varies from year to year and can be anything between ten and twenty and they come from other Colleges in London University as well as from King's. Secondly, there are usually between six and ten postgraduates working on a research subject leading to an M.Phil. or a Ph.D. Thirdly, and by far the largest category—usually up to twenty-four postgraduates, and usually men (any women on the course being highly conspicuous)—are those studying for the one-year M.A. diploma, the examination for which consists of three written papers and an extended essay. They study the development of the theory of war and strategic thought and the history of warfare from the end of the eighteenth century to the Second World War; and in a second paper, nuclear strategy and deterrence, as well as regional security problems, guerrilla and counter-insurgency warfare and the patterns of contemporary civil-military relations since 1945. In the third paper the M.A. students offer a special subject which can vary from the literature of the First World War to the problems of disarmament and arms control and from the military policies of the Great Powers between the Wars to the ethical aspects of war, a subject which is very much concerned with whether it is possible to make moral judgments about war and how this might be done.

The collections

The War Studies collections share a library on the third floor of the new Strand Building with the College History Library, a highly sensible and very useful arrangement, for the two fields are complementary if not an extension of each other and we find that war studies students frequently need to consult books in political or, say, economic history and history students from time to time will perhaps need to have some detailed knowledge of a particular military campaign. As I have already implied the War Studies Library reflects the needs of teaching. It is very strong in the history of the First and Second World Wars, not only in the origins, course and results, but also in their diplomatic history and detailed treatment of the campaigns. For the Second World War there is much on the campaigns in Western Europe and North Africa; and Russia and the Far East receive nearly equal treatment. The military and naval history of Great Britain, France and Germany are particularly well covered, military and naval biography of Great Britain, for example, being quite outstanding. Other wars in the nineteenth and twentieth centuries are not neglected, there being reasonable collections of books on the American Civil War, the South African War of 1899–1902, the Russo-Japanese War of 1904–5, and finally the Korean and Vietnamese conflicts of recent memory. In the instance of the last the output of material (particularly American) threatens to overwhelm us. We have sizeable sections on the economic aspects of war, for example the mobilization of a country's resources for war, and also on international affairs, including international arbitration. Into this class fall all the books and pamphlets on the League of Nations and the United Nations. Then we move on to military education and the different defence policies of nations. Here again the United States is highly prolific: we have three shelves full of books on US defence policy, mostly since 1945. Finally, there are those sections of the collections which are concerned with special aspects of war: the theory and practice of war, central to which is the study of Clausewitz, military and naval strategy and tactics, guerrilla warfare, subversion and counter-insurgency, as well as infantry, cavalry, armoured warfare and artillery. I must also not omit to mention our growing collection on the ethics of war, largely built up since 1971. This includes books on pacifism, the idea of the just war, resistance to conscription, and the attitudes of society to the military and even the police.

Expenditure

The Library contains little on military medals and awards and armour, i.e. suits of armour as opposed to tanks and other armoured vehicles. Nor do we have many books on regimental histories. This is not because we despise such books (indeed, we should be glad to accept them as gifts) but money being limited we can only justify expenditure on books which support the teaching in the War Studies Department. As regards expenditure, in the present financial year £850 will be spent on books for the War Studies Library, plus an indeterminate amount from a special Ministry of Defence grant for books on the ethics of war. The sum of £850 was fixed by the College Library Committee at the beginning of the financial year which effectively starts with the University session, having regard to previous and estimated future War Studies Library expenditure and the size of the budget for the whole of the College Library. Fortunately, the cost of the War Studies periodicals is met from the College Library's periodicals fund and thus does not encroach on book expenditure. Our list of about 12 current titles includes the well-known *Journal of the Royal United Services Institution,* the run of which at King's stretches back to the middle of the nineteenth century. Books and periodicals now number an estimated 11,000 volumes, of which about 2,000 are in store, either on the premises or at the University Depository at Egham. The volumes in store are those for which there is less demand, being old or out of date, back runs of periodicals and a good many books in French or German on the military history of France and Germany in the nineteenth century. If required, material at Egham can be brought up by van within twenty-four hours.

Reserved collection

In this context I should mention the War Studies Reserved collection. This is a group of about 120 text books kept apart from the main classified sequence in a locked case, and these are books in great demand or books so valuable, because sometimes out of print, that they cannot be kept on the open shelves. They may of course be consulted during library hours or borrowed overnight, but only against a signature on a special voucher. A substantial number of the Reserved Case books are duplicate copies and in instances where a book is obviously going to be a valuable standard text the War Studies Library has tried, in so far as money permits, to buy more than one copy, say one for the open shelves and one for the Reserved Case. A case in point is the new edition of Clausewitz's great classic *On War* edited by Howard and Paret; we have bought three copies, one of which has gone into the Reserved Case.

Purchasing

Even though anyone in the College, staff and students alike, may suggest or recommend the purchase of a book, the actual orders for new books come from the Department, in this instance the War Studies Department and naturally they have to keep within the bounds of their annual grant. It may appear inhibiting or frustrating for the Assistant Librarian in charge of a subject field not to have a say in book selection, but bearing in mind that the Department know what they want for teaching purposes, it is not difficult to understand. Requests from various members of the Departmental staff are channelled through one member of the staff who keeps in close touch with the Library subject specialist. As I have a very easy and informal relationship with the War Studies staff, the system works well, especially since it is also part of my work to alert them to the appearance of important and likely works for the War Studies Library, books which might otherwise get overlooked.

Cataloguing

Books are catalogued by the Anglo-American rules, usually centrally by a small team of descriptive cataloguers, and cards are produced by tape-typewriter for the author and subject catalogues in both the Union Catalogue in the central part of the Library and in the War Studies Library catalogue. We do not do analytical cataloguing of periodical articles and as yet we have not embarked on an index to the subject catalogue which I will allow makes it difficult for a non-expert to use; so that, for example, if a reader wanted to discover what the Library had on counter-insurgency he would first have to find the classification number for that subject.

Classification

Nearly all the sectional libraries in King's College are classified by the Library of Congress classification and War Studies is no exception. I personally classify all the books that go into the History and War Studies Libraries. As is well known, Congress enables a Librarian to classify in great detail, but it is sometimes in too great detail and more often detail in the wrong place. If I were dealing with cavalry, for example, I could find separate places for stream crossing, cavalry reconnaissance, cavalry sword exercises and even camelry and camel troops. All this, of course, is absurd, and despite my having the 1952 edition of the Military Science schedule, the pre 1914 origins of this particular classification are all too plain. On the other hand, there are no satisfactory places for arms control and civil–military relations on which we have many books and I have had to develop subversion and counter-insurgency from guerrilla warfare which I believe is logical. It has also not been easy to deal with books on aggression and conflict resolution. The treatment of a country's army also presents something of a problem. To take Great Britain as an example: at the beginning of the DA schedule dealing with Great Britain's history there is a reasonably planned section for our military history, while in the UA Classification there is a very detailed section for the history, organization and description of the British army. It is not always easy to see precisely where a book should go, but I have tried to overcome the difficulty by placing books with a historical emphasis under DA and those with a more obviously military bias under UA. Because of inadequate detail some sections of the War Studies Library have become very crowded: the defences of the West and of NATO in particular and United States defence policy spring to mind here. Also, there is not now enough detail for the armies and defence policies of the former British and French colonies in Africa and Asia.

Borrowing facilities

Students in War Studies usually arrive in the Library with their reading lists and so, being for the most part postgraduate and therefore having had some experience of academic libraries and having been instructed by me at the beginning of the session on the practicalities of using the War Studies Library, they are usually in a position to be able to find what they want. It follows that there is little scope for readers' advisory work; I am seldom asked actually to recommend books on a particular subject. We will, however, be asked for help if a book cannot be found on the shelves or if the reader wants to know whether the item has been borrowed by someone else. All students, both undergraduate and postgraduate, are allowed to have not more than ten books at any one time from any part of King's College Library and each book as well as a back volume of a periodical will be stamped with the date of the first Monday of the succeeding term, by which time all books must be returned, otherwise a fine is incurred at the rate of five pence per volume per week overdue. An exception to this rule are the Reserved Case books which must be returned by 10.30 a.m. on the succeeding day (or after the week-end), otherwise they become subject to fines of ten pence per book per day. Books are renewable at the discretion of the Assistant Librarian-in-charge and books can also be recalled if they are required by another reader.

Photocopying

Naturally, there are possibilities for photocopying, though this is done in the Central Library and may either be carried out by the Library staff or by the reader on a newly-acquired coin machine at the rate of five pence an exposure. We also undertake to order through the inter-library loan service books which are urgently required and are not on the shelves in King's. Books from the University Depository will also be ordered through this service, but the Library staff will bring up from store a volume of a thesis, a complete set of which we hold for the past students of the College in the M.Phil. and Ph.D. degrees of London University. Mention of library co-operation prompts me to say that our War Studies Students are helped by having access to Libraries with similar collections, the Royal United Services Institution and the International Institute of Strategic Studies being especially generous in making their library facilities available.

Space

No Librarian can avoid saying something about space problems and losses of books. King's College is more than usually vexed by lack of space, for we are hemmed in on all four sides and can only expand in the Strand area by jumping the street, which in a decade of financial shortage and a neighbourhood of very high property values is virtually impossible. All departments of the Library are affected by this congestion, and so in the War Studies Library we adopt a policy of constant relegation, which means that when the shelves are tight, older or little-used material is banished to the University Depository at Egham.

Book losses

Perhaps one should ruefully add that library losses do a little of our work for us, except that they are not usually the books we want to lose or send down to Surrey. I am bound to say that our losses are not negligible, a matter always discomforting for a Librarian because he is always forced to wonder whether there was something more he might have done to prevent them. We stipulate that bags and cases must not be brought into the Library and it is within my discretion to challenge a reader whom I may have good reason to believe is removing a book from the Library without signature; but short of having electronic devices on the books or a unitary library with a single entrance and exit controlled by a janitor who examines every volume leaving the Library, it is difficult to institute a thief-proof system.

Liddell Hart Library

Before the end of this year the War Studies Library and the adjacent Military Archive will have the great good fortune to receive from their present home, States House, Medmenham, the books and papers of the late Sir Basil Liddell Hart, the eminent military theorist and prophet of armoured warfare. This will be the most splendid purchase in the history of the War Studies Library and of a size, scope and consequence that is not likely to be paralleled for many a year. Two seminar rooms at present used by the Spanish Department and behind the War Studies Library will be converted this summer to form an entirely self-contained Liddell Hart Library of some 7,000 volumes, including some back runs of periodicals. On a rough estimate we think that possibly as many as half this total will duplicate books in our own War Studies collections, but as you will imagine it is very strong in military theory and modern strategy and tactics as well as in the history of the major wars of this turbulent century. It is also rich in biography and other studies of inter-war politicians and Second World War military figures, with so many of whom Sir Basil engaged in lengthy correspondence and sometimes wordy warfare. He was indeed a relentless correspondent and indefatigable preserver of newspaper cuttings; he was also an avid marker of his own books, a good many of these on the inter-war and Second World War periods being fairly barnacled with comments—usually adverse—on what was written. These of course form an additional record of Sir Basil's thought and will have to be kept separate in lockable cases, together with the 150 signed presentation copies from the eminent and the famous which form an extremely valuable collection in themselves. The whole collection has yet to be properly catalogued by AACR and classified by Congress.

The problems of running this library have not yet been fully resolved, but our present thoughts are that only bona fide scholars and researchers will be allowed access and that it will be for reference only, with probably six reader places. Security of course will have to be very strict. We anticipate that if there is a copy of a work in the War Studies Library it will not normally be necessary to consult the one in the Liddell Hart collection, unless of course there is a particular desire to see Sir Basil's comments.

Conclusion

This paper points out some of the problems confronting a small, highly specialized library operating on a limited budget and coping with restricted facilities.

BRIEF REVIEWS

LANCASTER, F. W. *and* CLEVERDON, C. W. *eds*. Evaluation and scientific management of libraries and information centres. Leyden, Noordhoff, 1977. 184 pp., illus., tables, refs. (ISBN 90 286 0656 4.)

The Proceedings of the NATO Advanced Study Institute on the Evaluation and Scientific Management of Libraries and Information Centres, held at Bristol, 17th–29th August 1975, includes the following papers: The evaluation of library and information services by F. W. Lancaster, The library catalogue: evaluation and use studies by Ben-Ami Lipetz, The evaluation of bibliographical resources by T. D. Wilson, Approaches to the evaluation of library reference services by Charles A. Bunge, The evaluation of machine readable data bases and of information derived from these data bases by F. W. Lancaster, Approaches to the evaluation of technical services in libraries by Ahmed H. Helal, Operations research and systems analysis by Ferdinand F. Leimkuhler, and An examination of cost/benefit approaches to the evaluation of library and information services by Christine Oldman and Gordon Wills.

EDMONDS P. J. *ed*. Directory of Technical and Further Education. 17th ed. 1977. 787 pp. £12.00. (ISBN 07114 34 115.)

The sixteenth edition of the Yearbook of Technical Education and Training published by Alan Charles Black in 1972 was announced as the final edition. A revised edition of this well-known directory has been published by George Godwin with plans to issue further editions in alternate years. This publication gives a geographical listing of polytechnics and other colleges of further education in the United Kingdom, and information listed for each of these institutions includes addresses of departments, names of officers and details of courses available. Details of universities with scientific and social studies faculties are also included, but not institutions concerned with professional medical education. As with earlier editions there is no subject index to the directory, and the detailed careers sections in earlier editions have been abandoned. For each broad subject area some relevant organizations have been listed, and these and other organizations and professional bodies are more fully documented in another section.

This directory contains a large amount of information and explains the complex structure of the educational system of the United Kingdom. The potential student should be able to trace details of grants and qualifications but unfortunately will not be able to select where it is possible to study his chosen subject.

Copies available from Information Department, Aslib.

Use of Mathematical Literature

Edited by A. R. Dorling

The heavy use of symbolic notation and abstract ideas in conjunction with a specialist vocabulary, makes mathematical research literature difficult to approach. This book should prove a vital reference source for students embarking on research in mathematics, working mathematicians exploring fields other than their own, and for all those, such as teachers and librarians, who have to handle mathematical literature or are interested in the structure of mathematics.

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The Information Worker: Identity, Image and Potential, edited by Margaret R. Raffin, Rona Passmore.

Proceedings of a one day joint Aslib/Institute of Information Scientists Conference held at the Geological Society of London on 22 November 1976.

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Aslib Publications

25 SEP 1979

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed at the Alden Press, Oxford

ISSN 0001 253X

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Aslib Proceedings

VOLUME 29 SEPTEMBER 1977 NUMBER 9

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Management accounting and library activities

J. C. R. Hewgill M.B.E. E.C.M.A.

The Institute of Cost and Management Accountants
Director of Technical Services

Paper presented at a one-day conference, 'Valve for money: costing and some aspects of cost effectiveness in the library/informatiom unit', held at Gregory House, the Thomas Coram Foundation, Brunswick Square, London on 8th March 1977

ACCOUNTANCY IS NO mystic, druidic activity but a means devised by practical people to express the use of resources (and any returns from commercial activities) in a common measure—money.

Cost accounting is the simple process of breaking down resources to the activity being carried on and then collating the monetary cost to show the cost of the activity.

An oversimplified statement might be:

Cost of library	£1000
Number of loans made	1000
Cost of each loan	£1

However, this pays no attention to time. How long a period? Does it refer to time past—historic accounting? Does it mean a forecast—future accounting for management control?

This leads to **Management accounting** which is concerned with decision making and therefore with future events. For a precise definition of these and many other terms, the appropriate reference is *Terminology of Management and Financial Accounting* by the ICMA.

The statements about both these accounting processes also ignore the fact that organizations differ and carry on many different activities. Since managers can normally only make direct decisions on their own area of responsibility and desire to know the effect of those decisions, it is necessary to break down costs to specific functions as well as activities.

Since there is always more than one way to present any set of numbers, so there are three ways to present costs (Figure 1).

The same pile of gold can be represented to different people for various purposes. It is however well known to any accountant that Murphy's Law applies equally to accounts—'The analysis needed is always the one which is not available'.

At this point it is advisable to pause and remember that accounting is not an end in itself. There are usually two main reasons for keeping accounts:

1. Has the cash or resources been used for the purpose for which it was intended? *i.e.* no waste, fraud, defalcation or misdirection—stewardship.

Aslib Proceedings, 29 (9), September 1977, p. 304–309. Printed in Great Britain

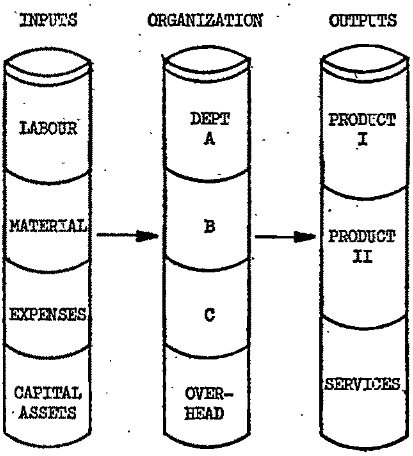

FIG 1. *Three ways to present costs*

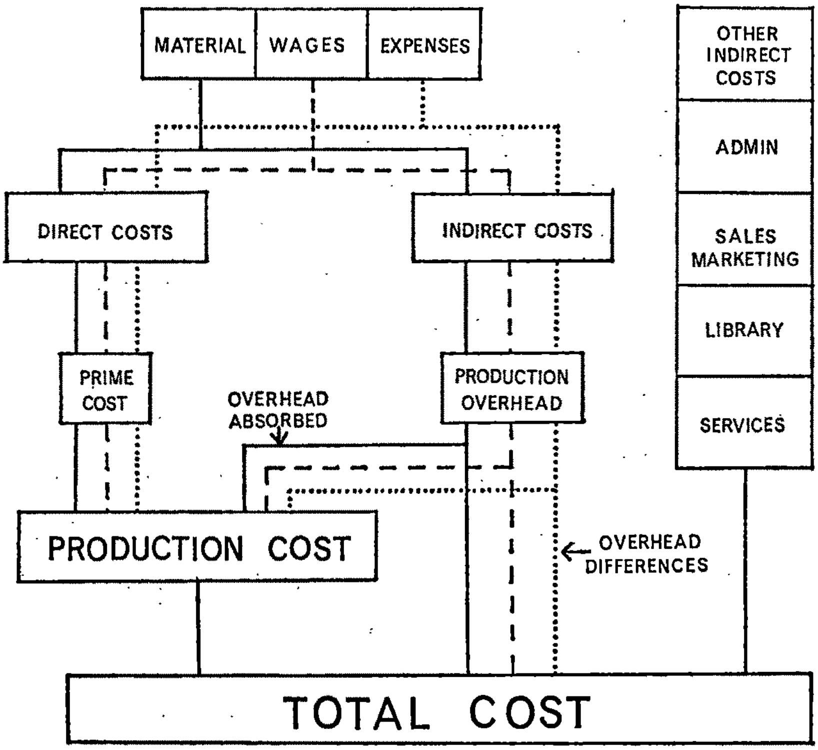

FIG 2.

2. Are the resources (cash is a resource too!) being used effectively? *i.e.* how can they be used more effectively?

The two sets of data derive from the same source. The purpose is different. Because accounts need to balance exactly there is a tendency to think of them both to the nearest penny. This is necessary for the first, but not for the second, where we are dealing with the future—any forecast is (by definition) uncertain and imprecise—accuracy to more than two or three significant figures is seldom worth the effort.

Any plan or budget therefore needs to be treated with circumspection. In fact this imprecision is the basis for managing the organization. By using actual results arising and recorded, compared with the forecast budget, with reasons for differences analysed (if it is worth the effort), managers can decide whether the differences are controllable and take appropriate action to contain overspending (or improve underspending).

Resources used may be directly related to the activities carried out, i.e. the number of parcels posted dictates postage cost (provided no action is taken to control weight), whereas in libraries labour cost tends to be fixed. This leads to the need to identify differential cash cost—(variable cost) from other costs (fixed costs). It depends upon the level of the manager, what is fixed and what is variable. Also cost in cash terms may be fixed, but the resources (usually labour) can be varied to different tasks, thus changing the departmental or activity cost without changing the total expenditure. Libraries tend to be in a situation where their outputs are not sold (or even saleable). They therefore have to be considered in the light of another type of analysis (Figure 2).

Indirect costs have their own characteristics, of which the four main ones are:

1. Not related to direct production/output quantity.
2. Not controlled easily.
3. Frequently not managed by the same managers as production.
4. Products/services are not sold.

This introduces another fudge factor into any cost calculation equation; overhead cost is (by definition) not easily directly related to the output activities, *e.g.* the head librarian is not easily costed out to loans, purchases, indexing or literature searches carried out by staff. It therefore becomes necessary to bring in some form of cost-sharing between departments of activities (Figure 1), this arbitrary sharing (apportionment or allocation) means that ouput costs will always be imprecise, which means that management should not be too concerned with small changes caused by this process.

Having derived an organizational breakdown in order to devise the second analysis in Figure 1, it might look like this.

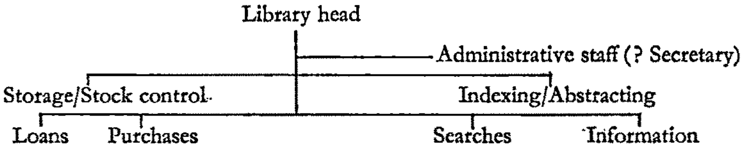

FIG. 3: *Organization of a library*

From this organization it is probably fairly straightforward to find the second and third analyses in Figure 1. However the organization will be more likely to look like this

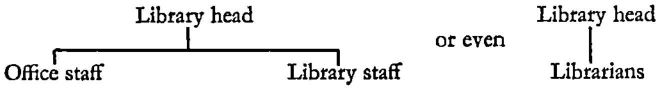

FIG. 4: *Organisation of a Small library*

The activities of any of these may be direct or indirect and it is necessary to derive some sort of set of records of activity to find out what proportion of time (and material) is used for each. Once this has been done, the framework for cost analysis and control exists and steps can be taken to establish cost behaviour related to activity and management decisions.

Cash → Differential costs based on → *Cost behaviour*

$$\textit{from}\text{ knowledge of }\begin{cases}\text{variable}\\ \quad\text{(marginal)}\\ \text{semi-variable}\\ \text{fixed}\end{cases}$$

Cost/output or cost/activity ratios are easy to find, *e.g.* £/loan, broken down to direct (postage, packing and labour)+indirect (control, accommodation, electricity, etc). The management problem is to find out whether this is the 'right' cost. Various methods are available such as:

1. Internal comparison within an organization, (however lower cost may mean poor service!)
2. External comparison between organizations, (*e.g.* via Centre for Inter Firm Comparison)
3. How much will managers stand being charged to their overheads?
4. How much would the service cost commercially?

However, these ignore the quality and 'rightness' of the service—the customer's view point. This is probably much more difficult to measure. Possible methods are:

5. How satisfied is the customer?
6. Cost/Benefit analysis—*i.e.* does the measured benefit justify the cost? This implies finding a measure (not easy).
7. Cost-effectiveness analysis—how effective is the service, *e.g.* 100 per cent effectiveness may or may not be a good thing?
8. Reaction speed—how long does it take to produce the service, *e.g.* within one day or three weeks (on average!)?
9. Penalty cost—how much does the organization lose if the service is reduced or discontinued?

Continuous monitoring of these compared with a unit or activity cost will also provide a measure of control of indirect costs. Other possibilities are:

(a) Restriction of inputs.
(b) Measurement of outputs.
(c) Arbitrary regulation of activity.
(d) Management by objectives (MbO).
(e) Incentives.

However, managers also like to know the effects of their decisions and these may take various forms. These effects should not just happen, they should be planned and objectives set, which brings us back to the forecasting aspect. Whilst it is quite acceptable to continue the service as before at the same cost as last year, it is seldom that circumstances or organizations allow this, so targets should be set realistically, assumptions stated and understood and accepted by all concerned.

How to measure changes in cost/performance

Savings
↓

$$\left.\begin{array}{l}\text{physical}\\ \text{cash}\end{array}\right\}\begin{array}{c}\text{present}\\ +\\ \text{future}\end{array}$$

leading to Improved service (or reduced)

$$\text{using}\left\{\begin{array}{l}\text{cost-benefit analysis}\\ \text{cost-effectiveness analysis}\\ \text{alternatives (differentials)}\end{array}\right.$$

- Reduced to basic principles, the effective use of accounting data must be founded on good and sensible management practice on the following lines:

1. The use of forethought to assess future workloads.
2. To set performance targets for work done, *e.g.* speed or reaction.
3. To decide on staffing levels and processes to be used, *e.g.* second class post.

These lead to

4. Preparation of a forecast budget in both physical and monetary terms.
5. This is analysed as simply as possible to show who *controls* the expenditure and distribution of resources.
6. Records are kept to show actual results to be compared with the forecast.
7. These are *formally* reviewed at regular intervals to ensure that decisions are taken, when needed, to get closer to the forecast *or* to recognize and cater for inescapable changes of circumstances.
8. Staff are educated to carry out this process, sensibly with understanding, so as to avoid the process being one of inquest and blame and to make it one of positive forward thinking and better management.

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Evaluating an in-house or bought-in service

A. R. Blick

Head, Information Services, Beecham Pharmaceuticals Research Division

Paper presented at a one-day conference, 'Value form oney: costing and some aspects of cost effectiveness in the library/information unit', held at Gregory House, the Thomas Coram Foundation, Brunswick Square, London on 8th March 1977

Introduction

THE BEECHAM Pharmaceuticals Research Division (BPRD) is that part of Beecham Group concerned with research into ethical products, that is, into drugs which only can be obtained on prescription. The Research Division has a staff of about 1,000. The Information Services Unit serves these staff with their information needs and to do this there are twelve information scientists, four librarians and sixteen assistants. The information budget for salaries, materials, services, etc., totals several hundred thousand pounds. The service offers current awareness via an in-house bulletin; conventional retrospective searching plus the use of Derwent systems and on-line searching of the Lockheed, BLAISE and SDC data bases; in-house documentation via a Master File and WLN chemical structure indexes. The budget figure is quite large but in the pharmaceutical industry information budgets of £1m per annum are known.

Any management is going to ask for justification of such large expenditure and ideally an information service should be able to show cost benefits appropriate to such a large investment. However, it is virtually impossible to demonstrate cost benefits in information work because one cannot put a value on information itself. It is obvious therefore that one must do the next best thing which is to show that an information service is being developed on a clear-cut, positive, sensible basis and that its systems and services are cost-effective. The demonstration of cost effectiveness can involve the collection of statistics on the use of the service or part of the service, detailed comparisons of alternative systems such as bought-in versus in-house systems, and market research among customers. However, a sense of proportion is necessary and the cost of obtaining the basic data must not be excessive in comparison with the cost of the service or facility being examined. Measurements can be part of any information service operation but of course external circumstances can dramatically alter any situation and render the value of the measurements worthless. An example of this is the sudden introduction of on-line searching facilities in the information profession which has thrown into question the justification for purchasing several literature searching tools.

The most effective way to discuss the evaluation of in-house and external

Aslib Proceedings, 29 (9), September 1977, p. 310–319. Printed in Great Britain

services in an information service is to give some examples of evaluations which can be done.

Parameters used

The main difficulty in performing comparative evaluations in an industrial information service unit is the lack of effort available for such work. Most industrial information units are heavily loaded with routine work and the staff of the units cannot set aside the time to do the research required to obtain basic data. In the following examples some of the figures given have been derived from basic data, some from experience of several years' work in the provision of information services and some from customers comments.

There is a large element of 'guesstimation' with many of the figures but this is frequently what management is all about. It is easy enough to make sound decisions when all the data that may be needed is to hand, the management skill comes into effect when decisions have to be made on the basis of inadequate or incomplete data.

There is no weighting given for the different parameters used, as the weightings appropriate in the Beecham Pharmaceuticals Research Division information service may be inappropriate in a different environment. An example of this is the parameter 'skilled labour commitment', In a well-staffed information unit a substantial involvement of skilled information staff in a particular service may not be a problem and so the parameter would receive a normal weighting. In a unit limited to one or two information scientists there would be little chance of any additional heavy involvement of information staff and services involving the minimum of information staff time would be preferred. In this case, the parameter would have a low weighting.

It must be stressed that the figures given in the following tables are not 'real' figures. The tables have been compiled to indicate how decisions can be reached on which is the sensible approach from amongst several different alternative approaches. The conclusions reached from the results of the tables are not necessarily valid conclusions. The purpose of the exercise is to illustrate the decision-making methodology.

Example 1—Evaluation of an in-house information bulletin and comparison with external services

Beecham Information Services provides a weekly Information Bulletin compiled from the current literature. The information scientists are very closely associated with the research work in the laboratories and so are able to scan incoming journals and Current Contents for articles of interest to the R and D scientists. These articles are typed and issued in the weekly bulletin. The bulletin contains a reply-paid slip and all the research scientist needs to do is to complete the slip to get a photocopy of any reference he requests sent to him from the library. An analysis of the cost of the bulletin showed that if scanning, typing, printing and material costs were taken into account an annual expenditure of *c.* £40,000 is involved. In order to examine the value of the bulletin and see if it was meeting its targets: (a) a measure of relevance of the bulletin and (b) a detailed investigation of the value of the bulletin to the customers was made. This latter exercise is reported in the *Information Scientist,* March 1975, vol. 9, no. 1, p. 19–28. The detailed investigation of the bulletin's value was achieved by a large amount of customer research. The results of this customer research showed that the bulletin was justified on at least two counts. The first one was timeliness. Nine per cent of the items in the bulletin were considered as vital to their work by scientists and 45 per cent were considered as important. For the majority of the vital items the customer considered that a delay of more than one week in the notification of the item would have been excessive and a delay of more than eight weeks was too long for the important items. But for the bulletin, 59 per cent of the vital items and 50 per cent of the important items would have escaped customers' notice and a further 35 per cent and 15 per cent respectively would have reached them too late.

Thus the value of the in-house bulletin has been investigated, but is it the best way to meet the needs of the scientists for current information? The bulletin is obviously of real value but the question is can external services do it cheaper or more efficiently? There are obvious weaknesses in the bulletin, *e.g.* it is titles-only and the provision of abstracts would definitely help. Also, how does it compare with coverage of the external services? To digress for the moment on coverage. The service which has the best coverage is the service which includes in its selection of items from the literature the most items relevant to the needs of our scientists. The external services which are of special relevance to BPRD are Ringdoc, Medline and Excerpta Medica. Now if one compares these services (Figure 1) one finds that they all include some of the abstracts the others contain, they all have some unique items and they all miss some. Added to this they all have different depths of indexing and different types of indexing so in the end it is virtually impossible to decide which has the best

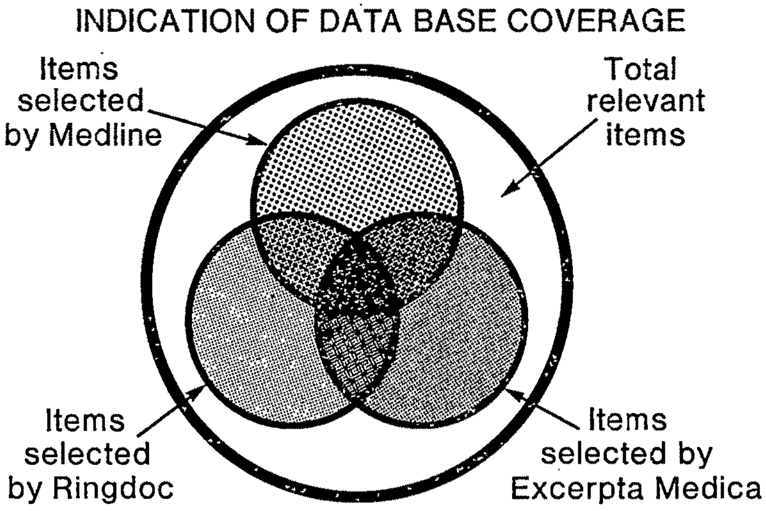
INDICATION OF DATA BASE COVERAGE
Items selected by Medline
Total relevant items
Items selected by Ringdoc
Items selected by Excerpta Medica

FIG 1: *Comparison of Ringdoc, Medline and Excerpta Medica services*

coverage and retrieval facility without a major investigation which would take at least several months. A working information service cannot afford to set aside this time. Because of this complexity of information on coverage the in-house bulletin coverage cannot be compared with these data bases but it is estimated that as in the Beecham libraries the journals most relevant to our research interest are taken, and as *Current Contents Life Sciences* are scanned, the coverage by the bulletin must compete with these other services.

Consider five alternative ways of current awareness notification:

1. In-house bulletin as per present BPRD bulletin.
2. In-house bulletin with abstracts.
3. SDI titles only from a commercial service such as ASCA or ANSA.
4. SDI with abstracts or equivalent, *e.g.* UKCIS profiles.
5. SDI run in-house from on-line data bases in the US, UK, etc.

A table can be drawn up of the essential features of a current awareness service for BPRD scientists. The way the five different alternative approaches to current awareness notification match these features can then be scored in the table (Figure 2). The approach which realizes the highest score should be the preferred approach.

Feature	Titles-only Bulletin	Abstracts Bulletin	SDI Titles-only	SDI Abstracts	SDI On-line Titles-only
Timeliness	8	4	4	4	6
Relevance	7	7	4	4	6
Cost	6	3	8	7	6
Customer convenience	4	10	3	8	3
Suitability for large No. of customers	7	7	3	3	3
Total	32	31	22	26	24

FIG 2: *Five alternative approaches to current awareness notification*

It was pointed out in the preamble that the figures given in the tables are, for the best part 'guesstimates'. However, some brief reasoning on the scorings can be given for Figure 2.

Timeliness: our investigation of the in-house 'titles-only' information bulletin showed that timeliness was of vital importance in current awareness notification. Therefore, the in-house 'titles-only' bulletin scores eight because it is the fastest of the five alternatives. The same bulletin, but produced containing abstracts, would be considerably delayed because of the time-consuming nature of abstracting and then of typing the abstracts. 'SDI titles-only' and 'SDI abstracts' both suffer from the delay of having to be input into the computer data base, matched against a profile and then posted to the customer. This inevitably produces a delay in comparison with immediate selection from in-house journals, although the length of the delay varies from service to service. 'On-line SDI titles-only' is quicker than the previous two because the postal delay does not apply but it still contains the delay implicit in building up a computerized data base.

Relevance: the measurements conducted on the in-house 'titles-only' bulletin show it has a relevance of the order of 60–70 per cent. This relevance would be the same if the bulletin was produced as an 'abstracts bulletin'. However, 'SDI titles-only' and SDI abstracts', when matched against the total spectrum of interest of the BPRD scientists, cannot really cope. The diversity of interests means that the profiles have to be impractically large unless very general profiles are compiled. Such profiles can be used but contain a high level of noise. Therefore these two alternatives do not score well on relevance. The 'SDI on-line titles-only' approach suffers from the same objection but some reduction in the amount of noise can be achieved by adjusting the profile when a trial print has been run. Adjustments to the profile on-line can therefore increase the relevance.

Cost: the 'titles-only' bulletin is considerably cheaper than that 'abstracts bulletin', given the same amount of items per bulletin. The 'abstracts bulletin' is probably twice as expensive and so scores lowly. 'SDI titles-only' is a very cheap way of obtaining current awareness notification and 'SDI abstracts' is only marginally more expensive due to longer print-out, etc. 'SDI on-line titles-only' can be used to achieve a smaller print-out with less noise but loses the cost reductions achieved by UKCIS, ISI, etc. in running large numbers of profiles.

Customer-convenience: Feedback from BPRD scientists implies that their ideal current awareness notification systems would be a high speed, weekly, in-house bulletin containing good abstracts. The provision of abstracts obviously rates highly as a convenience. The 'abstracts bulletin' therefore scores ten for convenience whereas the 'titles-only bulletin' scores badly due to the inadequacy of titles-only as an indication of content of an article. This inadequacy applies to 'SDI titles-only' and 'SDI on-line titles only' and in addition these latter two are in a computer print-out form which is not well received by customers. 'SDI abstracts' scores well because of the presence of abstracts but loses a little because of being a computer print-out, generally complicated with keywords, etc.

Suitability for large number of customers: The objective of this exercise is to find the best way of notifying a large number of BPRD scientists of new articles of interest to them in the research. A 'title-only bulletin' or an 'abstracts bulletin' are convenient ways of doing this and are well-received by customers. SDI by computer print-out does not lend itself to compilation into a bulletin form or to the production of 420 copies (the number of copies of the bulletin required.

Total: The addition of each column in Figure 2 gives a total for each of the five alternative means of current awareness notification. These totals are comparative one with the other. It can be seen from the totals that the 'titles-only bulletin' and the 'abstracts bulletin' are almost equally the best approach to take and either one would be suitable. The computerized systems do not appear to be suitable approaches in comparison.

Example 2—Evaluation of in-house versus bought-in systems for current awareness on a single topic

The first example discussed concerned the current awareness notification to BPRD scientists of items relevant to the complete spectrum of their interests. The second example discusses current awareness notification on a single topic when timeliness is not of great importance. An example of such a topic would be 'health hazards in the chemical industry'.

The same features of the service, and the five alternative approaches, discussed in example 1, are valid in deciding which is the best approach. Figure 3 shows the table as it looks for current awareness on a single topic.

Feature	Bulletin		SDI		
	Titles-only	Abstracts	Titles-only	Abstracts	On-line
Timeliness	5*	4	4	4	5
Relevance	6	6	6	8**	8
Cost	3	1	8	8	6
Customer convenience	3	10	3	10	3
Suitability for large No. of customers	7	7	7	7	3
Total	24	28	28	37	25

*(Scaled down in importance) **Search on key words

FIG 3: *Suitability of alternative current awareness services*

Timeliness: as this is not important the advantage the 'titles-only bulletin' had over the other alternatives in the previous example is greatly reduced. It and the 'SDI on-line' are considered to have some speed advantage however.

Relevance: on a single topic, the relevance of 'SDI abstracts' from an abstracts data base such as *Chemical Abstracts Condensates* is higher than for all but the SDI 'on-line'. This is because the ability to search keywords in *Chemical Abstracts Condensates* increases recall and relevance appreciably in comparison with journal title scanning. With 'SDI on-line' the keywords may be searchable also to give the same relevance. However, only titles would be printed on-line for cost reasons.

Cost: The cost of producing a 'title-only bulletin' or an 'abstracts bulletin' would be the same as for producing the bulletins in example 1. The journals would need scanning by information scientists to select relevant items. On a subject such as chemical hazards a wide range of journals would need to be scanned. In comparison, 'chemical hazards' is a standard profile run by UKCIS on *Chemical Abstracts Condensates*, and as a standard profile is very cheap to obtain. Thus 'SDI titles-only' or 'SDI abstracts' are very cheap means of obtaining current awareness if the profile is a standard marketed product. The 'SDI on-line 'is also relatively cheap as an alternative to the bulletins.

Customer convenience: 'Bulletin titles-only', 'SDI titles-only' and on-line titles-only' notification is particularly inadequate in the case of chemical hazards current awareness The relevant bit of information is frequently contained only in the abstract and full paper. The 'Bulletin abstracts' and 'SDI abstracts' are very convenient for customers as they should be easily assessed on whether they should be followed up or not.

Suitability for large number of customers: The on-line print out from most terminals is not usually suitable for copying for widespread distribution. The print type, the formatting and the presence of commands, render it unsuitable. The other four alternatives lend themselves to reproduction quite easily.

Total: The totals for the five alternative approaches to current awareness notification on a non-urgent single topic such 'chemical hazards' show that 'SDI abstracts' is easily the best approach to take. The purchase of a marketed standard profile output from an agency such as UKCIS can be seen to be the most effective action to take.

Example 3—In-house data base compilation versus bought-in data bases

The third example follows on naturally from the previous discussion of current awareness systems. The items selected for current awareness notification, by whatever system used, are obviously of relevance to the customers or they would not be selected. If these items are accumulated over the years they form a very useful data base for retrospective searching. Many information services have built up such data bases in the past and some still run such systems. However, equivalent data bases can sometimes be purchased from commercial suppliers and the question is should one compile one's own data base for retrospective searching or buy one in. More recently, with the capital outlay of about £900 for a small terminal, access can be gained to a wide range of data bases on-line and this has required considerable rethinking of traditional approaches.

Feature	In-house data base	Bought-in commercial data base	On-line commercial data base
Coverage	6	8	8
Relevance	10	6	6
Suitable indexes	8	7	7
Cost	2	4	8
Skilled labour commitment	2	6	8
Controllable	10	7	3
Total	38	38	40

FIG 4: *Comparison of in-house data base compilation versus bought-in data bases*

Figure 4 shows a comparison of the advantages of putting the contents of the BPRD Information Bulletin into an in-house data base (which can be manual or computer-based) against buying the Ringdoc data base to run in-house (again in manual or computer form), or running on-line searches of the Ringdoc data base held on the SDC computer. Ringdoc is a data base of items selected from the current literature relevant to the interests of the pharmaceutical industry. It is prepared by Derwent Publications who also do the *World Patents Index*. One pays a basic subscription for Ringdoc and then can buy extras such as computer tapes, printed indexes, printed abstracts. Alternatively the basic subscription qualifies you to search the data base on-line on the SDC system. The basic subscription is about £7,000 and the computer tapes cost another £700 or so.

A tabulation has been made of the three alternative approaches to obtaining a data base relevant to the interests of BPRD research work. The desired features are listed in the table but, of course, the features required of a data base for retrospective searching are different from those used in the two previous examples where the application was current awareness.

Coverage: The coverage of an 'in-house data base' compiled from the contents of an information bulletin is reasonably wide, particularly if *Current Contents* is scanned as in the case of the BPRD bulletin. However, the coverage is limited to those items which were known to be of interest at the time they were selected. If the Derwent Publications Ringdoc data base is obtained as a 'bought-in commercial data base' or searched on a remote computer on-line as an 'on-line commercial data base' the coverage is much greater. This is because items are put into the data base which may not be particularly relevant to BPRD research interests at that moment in time. However, if the research interests change then these items could become relevant and would be found in a retrospective search. This would not be the case for the data base compiled in-house.

Relevance: The 'in-house data base' is a collection of items selected from the literature which are selected because they are relevant. The data base therefore must be relevant. Because the coverage of the 'bought-in commercial data base' and the 'no-line commercial data base' is wider (see above) the relevance of the data base to BPRD interests must be reduced.

Suitable indexes: It is vitually impossible to design a system which will answer any question put to it. However, if an 'in-house' data base is constructed then the indexes to that data base should be purpose-designed for in-house use. In other words, if you build up an in-house data base you should make sure you build in the right indexes as well. Thus an 'in-house data base' should score well on suitable indexes.

The indexes to the Ringdoc data base are varied and extensive. If one runs Ringdoc as a 'bought-in commercial data base' or as an 'on-line commercial data base' the index facilities are generally adequate for most questions. In practice, it is difficult to see how purpose-designed in-house indexes could be much superior.

Cost: The cost of building up an 'in-house data base' and the necessary sophisticated index systems required is high. The items for inclusion in the data base are readily available as entries in the in-house information bulletin. However, these items must all be indexed and to do that effectively, full copies of all the papers must be obtained. The papers must be read and indexed by skilled information scientists. The data must then be input into the data base, either manual or computerized, all of which involves considerable manpower effort.

In comparison, the Derwent Ringdoc package can be brought for *c.* £8,000 per annum. This package then can be maintained, partly or totally on a computer. The maintenance process will involve manpower and computer facilities with a consequent cost, albeit considerably less for the 'in-house data base'.

The cheapest way to obtain the data base is to use it as an 'on-line commercial data base'. The Ringdoc data base is accessible on the Systems Development Corporation, Santa Monica, California. Payment of the basic Ringdoc subscription of £7,000 per annum gains access to this data base. It then can be searched using the usual Ringdoc index facilities on-line. The only costs incurred, additional to the basic subscription, are those charged when logged-on to do a search of the data base. There are no maintenance charges.

Skilled labour commitment: Earlier in the paper the point was made that large information departments may have sufficient manpower available to look tolerantly on the extra involvement of skilled information scientists in specific activities but that small departments would not. Whatever the size of the department however, it could be argued that an information scientist is better employed retrieving and supplying information rather than coding and classifying information for storage. Of the three alternative approaches discussed for the provision of a data base the use of the 'on-line commercial data base' makes by far the smallest demand on skilled staff time. Conversely, the preparation of an 'in-house data base' makes heavy demands.

Controllability: Excluding this feature, the total scores for the three alternatives are 'in-house data base' = 28, 'bought-in commercial data base' = 31, and 'on-line commercial data base' = 37. Therefore the latter would appear to be the approach to take.

The only hesitation one would have about relying solely on an 'on-line commercial data base' is that one is at the mercy of the supplier. For example, if Derwent Publications Ltd decided it was uneconomic for them to maintain their data base on the SDC computer, it would be quite reasonable for them to withdraw it. A department which had completely relied on the on-line facility for retrospective searching would then be left without a data base. If the department had opted for the 'bought-in commercial data base' and had bought Ringdoc for in-house use, the cancellation of the Ringdoc Service would be a severe blow but at least the data base would be held in-house up to the time of cancellation. Some backlog would be retained. If the department had built-up its own 'in-house data base' it would have full control of the data base.

Total: The three approaches to the provision of a data base for retrospective searching, in total, are approximately equal. The on-line service is clearly the preferred approach if control is not considered a problem. Time will show whether or not this feature should be considered. It is still early days in the world of on-line access to commercial data bases and both users and suppliers must be in the dark to some extent as to what the future holds.

Conclusion

The purpose of this paper is to show one way of making comparisons of information services. In a real-life situation it is rare that all the facts are available that are required as input to decision making. This can be due to lack of available effort or time to get the facts, or it can be due to difficulty in deriving the facts. Consequently, quite major decisions can have to be made on an insubstantial basis. It is particularly beneficial in such circumstances to marshall the available information, whether it be in the form of facts or feelings, into a logical framework in order to make sensible comparisons.

The examples discussed were intended to illustrate this point. The individual features used and the scores given to the alternative approaches, will vary from information to information department. The solutions reached are not intended to be universal. They are meant to be indicative of one approach to system comparison.

The UK MEDLARS service: a personal view of its first decade

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Background

IT IS REASONABLE to date the birth of the UK MEDLARS Service as May 1976, when the first searches for customers were processed. MEDLARS came about because of the need to automate the production of *Index Medicus*. The forces which gave it birth included the pressure of growth of the Medical literature and the emerging applications to typesetting of computer technology. To comment on how the US National Library of Medicine had the initiative and found the resources to undertake this innovation is beyond the scope of this paper. Certainly, the fact that they launched MEDLARS and then shared it with the international medical library community, has been of profound importance to librarianship.

In the published *Index Medicus,* bibliographic citations are labelled with controlled subject headings and listed under them. Searching involves scanning the citations under likely headings, one after another. In a MEDLARS computer search, the machine can select citations labelled with combinations of subject headings. The list so produced should contain a much higher density of relevant material than the many lists under the individual headings. It is this factor which offsets the machine cost of computer searching.

There are other advantages: the neatly produced list from the computer printer; and the ability to search on terms representing minor aspects of the article, or concepts such as 'child' which are too broad to be useful as headings in *Index Medicus*. However, the power to co-ordinate headings is the prime justification. In some evaluation experiments, during the first year of the UK MEDLARS Service[1] we investigated several of these features. A proportion of the references retrieved and judged worthy of being read were not, in principle, retrievable by a conventional search in *Index Medicus* at all. A small but significant proportion of these were judged, after they had been read, to be of major importance, leading to actual changes in the user's research work. We also tried to estimate the cost-benefit relationship and found it to be heavily dependent upon the cost assigned to the time of the research worker, assuming he/she were to do an 'equivalent hand search' in *Index Medicus*. Since then, the cost of computing has markedly decreased relative to the cost of human time.

The computer technology of the early sixties necessitated holding the data base on magnetic tapes. In 1966, we had a quarter-million citations, on about twenty reels of tape. It was necessary to assemble a batch of search questions and then scan the tapes from end to end, copying all those citations which

Aslib Proceedings, 29 (9), September 1977, p. 320–325. Printed in Great Britain

met the specification of any of the searches in the batch. Afterwards, they were sorted and printed. The whole process took several hours.

For the first two or three years, the MEDLARS Service was a joint venture of the National Lending Library for Science and Technology and the Computing Laboratory of the University of Newcastle upon Tyne. The latter was funded by the Information Division of the Department of Scientific and Industrial Research, which was also the parent of the NLL. The NLL in the course of time metamorphosed into the British Library Lending Division and DSIR Information Division became OSTI and later the British Library R and D Department.

The original Newcastle MEDLARS programs were written for the English Electric KDF9, a machine now long obsolete, but remembered with affection by programmers. For a time, they were the most efficient MEDLARS programs anywhere, in terms of citations retrieved per computer-second. At the height of batch processing activity, there were ten processing centres within the USA and three in Europe, using at least four different makes of computer, and five different program systems. Growth of use was rapid in the UK reaching a peak of about eighty searches per week, although a quarter of these were done under contract to the French MEDLARS Centre. Shortage of processing capacity at Newcastle led to the successive use of other KDF9s at Salford University, at Kidsgrove and finally at Nottingham University, with the assistance of UKCIS.

Charge for MEDLARS services

In the early years, MEDLARS was free. It was found that filtering of requests by medical librarians and an obligation on the user to evaluate the output in detail, were sufficient to prevent trivial questions. The worst problems of this kind, at least in the view of the search formulating staff, were occasional contrived questions to test the system, emanating from official bodies, often from other countries. The idea of a charge for MEDLARS was discussed for a long time before it was implemented. A survey of users showed that 40% would be both willing to pay and able to find the funds. In fact, when charges were introduced, UK use fell to about 30 per cent of its former level and scarcely recovered until the advent of MEDLINE. There were probably several factors at work in this. By and large, medical librarians were intermediates in forwarding searches to the MEDLARS Centre. Not all of them were equally enterprising at obtaining funds for MEDLARS, which has an entirely different pattern of expenditure from book buying. Furthermore, the purchase of information by scientists seems to show behaviour more reminiscent of buying luxuries than buying a necessity.[2] It can also be compared/to the purchase of insurance.[3]

About the time that MEDLARS use was at its peak, a survey of loan requests for biomedical literature arriving at the NLL was made. It showed that the bibliographic tool which was the largest single source of requested references was *Index Medicus*. MEDLARS searches accounted for one-tenth as many.[4]

MEDLARS liason officers

The growth of use of MEDLARS was mainly epidemic, apparently encouraged by word of mouth. Advertising was not effective. During the first few years a number of MEDLARS Liason Officers were appointed in university centres and of these the longest serving was Miss M. King, at Newcastle. She conducted local publicity and processed searches for the university and for health service users. The level of use at Newcastle was eventually about three times as high as the national average and, by the end of the experiment, appeared to be saturated. However, in strictly commercial terms, the experiment was not successful. The cost of the Liason Officer's salary could not be offset by the value of the extra searches.

The MEDLARS Liason Officers were highly qualified and also fully trained MEDLARS searchers. On a broader front, we attempted to give an appreciation of the use of MEDLARS to medical librarians in general. There can now be few medical libraries in the UK which do not have one or more staff who have been on a MEDLARS course at Boston Spa.

Training courses

Following from this, the author has also conducted MEDLARS courses in Paris, Geneva (WHO) and in several American cities. The MEDLARS courses in the USA were probably the first concrete return to NLM for their initial generosity. Previously they had provided facilities for us to study the system, as a prelude to developing our own and they had provided the tapes themselves free of charge in the early years.

The UK MEDLARS training courses consisted of three sections:

1. 'MEDLARS in context', which explained the use of MEDLARS in relation to that of other guides to the literature.
2. 'The MEDLARS system' which explained how it worked and what could be expected of it.
3. 'Practicalities', which included 'how to fill in a request form'.

The courses tended to be informal and to depend greatly on the personalities of the lecturers.

The courses developed later in the USA followed these themes, but made much more use of audiovisual aids and they were more standardized and formal than ours.

MEDLARS II

Another personal contribution to MEDLARS development was made during the development of MEDLARS II, when the author, in collaboration with Professor F. W. Lancaster, worked for a month at the NLM on the design of vocabuarly. Our recommendations for the division into major and minor descriptors, for limiting the growth of qualifying subheadings and for seven levels of hierarchy of the main terms, are all features of the present system.

UK contribution

However, the major contribution of the UK centre has been in indexing British medical literature as input to MEDLARS. This is now part of a formal agreement between the two libraries, in which indexing and certain other services, form a *quid pro quo* for receiving use of the data base. Indexing is a skilled task, because the vocabulary is strictly controlled. The indexer must scan the article before him, grasp its main theme and delineate it with appropriate terms. He must also consider minor themes and significant negative results and be on the lookout for such things as adverse reactions to drugs.

Our indexers at the British Library Lending Division are all graduates, mostly from scientific disciplines. On average, it takes four months of full-time practice to achieve a satisfactory standard and speed. The indexers' work is checked by 'revisers' who also train the new indexers. Revisers always spend a substantial period of training at the NLM. Establishing harmony between them and the indexing staff at the NLM is the key to quality control in the whole enterprise. A generally happy working relationship between the two libraries has led to the development of a complex partnership, involving many novel activities.

An example of these is DOCLINE. Interlibrary requests are sent to the NLM by other libraries in the USA, in some cases directly to the NLM computer. A fraction cannot be met from NLM stock. Selected ones are transferred to a special computer file and this file is accessed daily from a terminal at the BLLD, via transatlantic networks. The requests are typed out automatically on standard BLLD forms and the copies are dispatched direct to the requesting libraries in the USA. About 150 requests per week are made and the BLLD can satisfy more than 60 per cent of them.

Workshops

As early as 1966 the NLM began to run regular 'workshops' for the technical staff of other MEDLARS centres and these were attended by staff of the foreign centres which grew in number. However, financial restraint on foreign travel made it difficult to send more than one representative each year and there were now many more who would benefit. In 1969, a series of European MEDLARS workshops was begun as a supplement.

The first was held at Boston Spa and was attended by about thirty people. Since then they have been held, more or less annually, at the other centres in rotation, in Stockholm, Paris, Geneva and Cologne and back to York and Stockholm again so far. In recent years attendance has had to be limited to about 80–100, all of them staff directly concerned with providing MEDLARS services in Europe. Senior staff from the NLM are always invited and when possible, staff from centres outside Europe, notably Australia, are present. The business of these workshops is the technicalities of our profession but they undoubtedly play a part in furthering international understanding and co-operation.

Interactive on-line searching

It seems likely that such workshops will have to adapt to the changes imposed by on-line MEDLARS access. In the past, under the batch process, searching was carried out by a small nucleus of highly skilled indexer-searchers at each centre. Searching skill is now much more widely diffused. among staff of all the libraries who have direct access from their own terminals. Furthermore, these people are often expected to be competent, not only on MEDLARS, but on the dozens of other on-line data bases which are now available.

That this is possible depends on an inherent feature of on-line searching. It is interactive. There is the possibility of a dialogue between the searcher and the data base, in which the searcher can refine his questions in the light of the references retrieved. In the batch process this was not possible. The searcher formulated the question as best he could and then waited a week or more to see the output.

One of the first on-line MEDLARS services was MEDUSA, run experimentally at Newcastle upon Tyne University, on an IBM 360/67 which replaced their KDF9. Because of disc limitations, only a three-month sample of MEDLARS could be stored but the main emphasis was on making the work of the searcher easy, by guiding him through the choice of vocabulary. This included providing him with access on-line to the indexers' authority file and also dealt automatically with variants of spelling between English and American and with singular and plural terms. There were ample cross references to guide the unwary, for example from 'heart' (the organ) to 'myocardium' (heart regarded as a kind of tissue).

In the earliest experiments, we set out to test the hypothesis that, with such a system, the scientist himself could make an effective search, without the need to explain his problem to the professional searcher. The results[5] showed that, by and large, he could. The stumbling block was time. The scientist spent very much longer sitting at the terminal than the professional searcher and so long as it is necessary to pay trunk telephone charges to connect the terminal to the computer, this arrangement is too expensive to contemplate.

After batch searches on the KDF9 came a batch service on an ICL System 4 machine. The INFIRS system was developed by UKCIS and technically it is a step towards on-line, because it uses inverted files on disc rather than sequential files on tapes. It was hoped originally that it might be adapted later to on-line operation and its search language was designed with this in mind. However, in 1973, access direct to MEDLINE at NLM, by way of transatlantic data networks, became possible and this soon became the standard method of access to MEDLARS. MEDLINE was cheaper and had more facilities and users could, if they wished, search from their own terminals.

MEDLINE on the NLM computer began with some limitations, but these were rapidly swept away. Now the last two to three years of the full MEDLARS data base, covering some 2,300 journals, is available direct. Backfile searches to 1966 are entered from the terminal but searched off-line, with printout sent by post. Not only is it possible to search on authors' names, index terms, qualifying subheadings and hierarchial 'trees' of terms, but now individual 'natural language' words in titles and abstracts can be searched also. This gives the best of all worlds: controlled vocabulary applied by trained indexers, for precision and natural language used by authors for retrieving new concepts or other features not reflected in the formal index language.

The use of the NLM computer within the USA more than doubled between 1973/4 and 1975/6. In the latter year, more than 400,000 searches were performed.

Use of the NLM computer by UK users amounted to some 2,400 hours in 1976, with about 120,000 pages of offline prints. This amounts to about 7,000 searches. It is a much lower total per head of population than for the USA. One reason for this is price. The cost to the UK user outside London is about £10 per search. Of this, roughly one-third goes to the BLLD for doing the indexing *quid-pro-quo* for use of the system; one-third is the cost of transatlantic communication via Post Office/Tymshare service and one-third is the UK internal telephone cost.

Future developments

During 1977 MEDLINE has become available on a computer in the UK as part of the British Library's BLAISE project. It is exactly like the US service except that it is available to UK users for more hours and every day. In cost, it is about the same and it remains true that it is more expensive to dial the BLAISE computer in Harlow from, say Birmingham, than to dial the NLM computer in Washington from California.

The next step/is the advent of EURONET, a data network for scientific and technical information sponsored by the European Community and expected to begin operating in 1978. At least two versions of MEDLARS are likely to be available on-line via this network.

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EURONET training workshop 1976

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THREE STATEMENTS by Dr R K Appleyard, the Director-General for Scientific and Technical Information and Information Management at the Commission of the European Communities, set the scene for the Workshop on training users of EURONET, held in Luxembourg on 13th–16th December 1976. 'Western Europe has made, and continues to make, prolific contributions of human knowledge through discovery and invention. In fundamental scientific research and advanced technological development we are continuously accumulating knowledge and know-how of vital importance for our long and medium term social economic prospects. In addition, the efficiency of our government and competitivity of our industries today depend, and will do so even more acutely in the future, on the acquisition and easy retrieval of "operational" information'. 'The purpose of EURONET is to enable managers, administrators, researchers and educators, irrespective of their location relative to where the information they need is stored, to obtain it as cheaply as possible, in good time, and with minimum inconvenience'. And, 'Why is training and education important in this context? The reason is simple: it is no use building EURONET if there are not going to be any users who can use it effectively . . .'.

Background

The decision of the European Communities to go ahead with encouraging the establishment of a European information network and of the training of specialists and the education of users can be traced back directly to the 24th June 1971 Council of Ministers resolution[1] which also set up the Committee for Scientific and Technical Information and Documentation (CIDST) to advise the Commission of the European Communities. Following much preliminary work on costs, technology, legal, and other factors, the 1975–7 three-Year Action Plan adopted by the Council of Ministers on 18th March 1975 provided for substantial funding, equivalent to several million US dollars, for the development of a European on-line information network, EURONET, which as a result of an agreement among the nine PTT administrations and an agreement between these and the Commission in December 1975, is expected to become operational at the end of 1978.

One of the Working Groups of CIDST is that on training of information specialists (WGTS) and an important part of its current mandate is the preparation of the ground for training of staff and users of EURONET. The

Aslib Proceedings, 29 (9), September 1977, p. 326–333. Printed in Great Britain

EURONET Training Workshop provided a major opportunity for discussion and initiation of recommendations in respect of training and of related aspects of EURONET, with and by experts from all the nine countries of the Communities from the industrial, educational, and other sectors concerned.

Objectives

The main goal, as expressed by Appleyard in the introduction, was 'the delineation of guidelines for the training of people who will be involved with EURONET', and among these, several distinct groups were identified. This scene setting was followed by speakers who provided a fuller background to the present and expected state of EURONET, highlighted some of the problems requiring to be considered in planning training for future EURONET users, and surveyed existing courses for actual and potential users of on-line systems in North America and in a number of West European Countries.

In the second stage, the Workshop participants split into three Working Groups, concerned with different types of EURONET specialists and in the third stage presented their reports for discussion in plenary sessions, with a final summing-up by the Chairman of WGTS in the concluding session.

EURONET

In his paper 'EURONET: Goals, Principles and Achievements', Mr G. W. P. Davies of the Commission of the European Communities, stated that the number of data bases expected to become available through EURONET in its initial phase is about 100 via more than twenty host computers spread over the nine Member States. These will be linked through switching nodes in Frankfurt, London, Paris and Rome and five remote terminal access points in Amsterdam, Brussels, Copenhagen, Dublin and Luxembourg, by a packet-switching telecommunications network. The price charged to Community users is to be kept as low as practicable and, in discussion, it was stated that processing of a half-hour connect time query might cost of the order of $25–30, of which the network telecommunications charge might account for not more than a few dollars, a figure which could be considerably lower than that of the 'local' telecommunications charge from the user to the nearest node or remote concentrator. The policy of EURONET is to ensure 'ready, unimpeded and non-discriminatory access' to the services for all Community users and to ensure their freedom in choosing the host computer used. For the future there are prospects for multilingual access and a common command language, both of which are the subject of Commission-funded studies. Whilst, initially, EURONET will be based principally on well-established data bases, new ones and some in-house ones are to become accessible. Those which may be offered by the Community Institutions include EURONER on the Economics of energy, various drug data banks, environmental data bases such as ENREP, ENDOC, and ENEX as well as the data base on Community legislation (CELEX), the Community macro-economic time series data bank (CRONOS), and the ECDIN data bank on chemical compounds and their effect on the environment.

In the discussion it was stated that the EURONET telecommunications facilities would become available not only for the EURONET information services, but also to 'private' users, such as companies or intergovernmental organizations, for their internal traffic.

User aspects

Dr C. L. Citroen of the Netherlands Organization for Chemical Information spoke on 'the training requirements of users of the future EURONET information services', suggesting tentative answers to the question: who is to be trained? for what? how? by whom? and when?

An order-of-magnitude calculation showed that it would require approximately 100 full-time instructors to provide a basic, but thorough, training for all the information specialists in the European Communities in one year, but 100 times as many to train all the scientists. On this basis, alone, it would be logical to concentrate first on these information specialists who act as intermediaries, but there is also some evidence that, at present, relatively few end-users do, or wish to, carry out on-line searches themselves. In the long term, one might consider training students in secondary schools and universities, and use some form of programmed instruction for those already working.

The intermediaries will need to know about access to a number of different systems, but not about all of those which are to become available through EURONET. They should also receive instruction in reference-interviewing techniques, organization of document delivery systems, and the promotion and marketing of services, perhaps in the general educational programme for the information scientists.

Experience shows that there is no substitute for controlled hands-on experience, perhaps on a system which simulates the actual on-line procedures as closely as possible and that teaches the user the principles by programmed instruction. Tools, such as manuals, will also need improving.

In view of the variety of topics requiring to be taught, team teaching drawing on data base producers, on-line operators, network operators, professional organizations, educational institutions, the Commission, and scientific societies, would initially be necessary.

Finally, preparation for a training programme should begin as soon as possible, taking into account the need for continuing education.

The discussion brought out the need for considering not only the case of intermediaries who are serving specialists, but also of intermediaries who are to work in 'public access' centres where fairly broad subject areas may need to be covered by each one of them. In either case, experience in the appropriate subject field of using manual indexes was considered a pre-requisite for training in on-line searching. Among the particular difficulties experienced by on-line searchers were the learning of truly interactive searching and the keeping up-to-date with data base and system changes and developments.

Training aspects

Training aspects were considered by Miss Stella Keenan of the Loughborough University of Technology. In a comprehensive factual survey she brought together information about on-line training activities by US and European data base producers, system operators (including on Canadian one), and educational institutions. In addition, the paper included a review of nationally-funded studies of on-line search teaching and of activities in this area by some international (*e.g.* EUSIDIC) and inter-governmental (*e.g.* UNESCO) organizations. The survey showed that a major effort has been, and is being, made to introduce large numbers of potential users to the use of a particular data base or of a system, especially through short, one-to two-day courses, and through an increasing effort of incorporating such education and training in the curricula of schools of librarianship and information science either as an optional or as a required subject. This report was well received and it was recommended that an up-dated (particularly in respect of the activities in several of the Community countries) version be prepared and published.

The discussion concentrated on the need for better documentation for helping users of data bases and systems, ranging from short one-page 'crib cards' for various levels of expertise and especially including instant information on error correction routines, to specialized manuals for diagnostic interpretation, training or routine use.

Working Group Reports

Training of managing and operating specialists

The Working Group was under the chairmanship of Mr A Tucker of Trinity College Dublin. The report, presented by Mr D Raitt of the European Space Agency, Frascati, identified two main groups, namely:

1. Those in a position to train others in the use of on-line information systems, such as
   (a) staff of suppliers of data bases and services (hosts),
   (b) lecturers of library/information science.
2. Those in a position to influence the introduction and use of information systems, such as
   (a) directors/managers of companies/firms,
   (b) public administrators,
   (c) academic administrators (including heads of teaching and research departments),
   (d) managers of library/information centres.

With the primary objective of the training given by the suppliers of data bases and services being the promotion of the use of their services via EURONET, the Group recommended that training be given on the communication aspects of EURONET and on EURONET hosts and data bases. The primary objective in the training of lecturers is the promotion of the education and training (at undergraduate and postgraduate levels) of future information specialists, and the Group therefore recommended training on on-line systems, especially command languages and search strategies, and on data bases and basic communication techniques. It was also recommended that the programme for the lecturers emphasize practical aspects, be not related exclusively to a particular on-line system or service, and be made effective and efficient with the aid of a study into the methods and requirements of teaching the use of on-line information systems, supported by the Commission of the European Communities.

The promotion of a rapid build-up of the use of on-line information services requires those in key decision-making positions to acquire knowledge enabling them to decide whether or not to use such systems in the organizations and units they are responsible for, and the Group therefore recommended that training be given on general aspects of information retrieval, basic concepts of on-line information systems and machine-readable data bases, economics of information, and the general EURONET facilities. The training for this group would best be carried out by means of informal sessions, of some one to three hours in duration, with audio-visual presentations and practical demonstrations.

The Group also recommended, as did the other Working Groups, that in each country a national EURONET centre of recognized status be set up, independent from the hosts and data bases suppliers, and composed of experts competent in data bases, networking, command languages, and subject areas, and that this centre promote and encourage training and information activities in support of EURONET, act as an independent adviser to users in that country regarding the data base(s) and system(s) most suited to their needs, and provide, preferably on-line, immediate help on operational and search problems. It was envisaged that representatives of the various interests would be associated with the national centre.

It was also recommended that a supranational EURONET centre be set up, comprising representatives of all the national centres and other experts acting under the auspices of the Commission and that a major function of this centre be the provision of guidelines for the national centres including outlines of training programmes, types of audience to be reached, training material required, and the (broad indication of) qualifications required of staff manning the national centres. The model training programmes and materials should be standardized for all Member countries and be made available by the Commission.

Training of intermediaries

The Working Group was under the chairmanship of Mr M. Ballarin of the Comitato Nazionale per l'Energia Nucleare, Rome. The report, presented by Madame Rozensztroch of the Bureau National de l'Information Scientifique et Technique, Paris, considered the need of the intermediary who was defined as 'any person who supplies information to users from sources to which he is capable of gaining access' and thus includes information specialists, subject specialists, computer scientists, and so on. The intermediary should have received higher education, at university level, or equivalent, and have specialized knowledge in the subject area of the specialist user and of the relevant data bases. He should also have some knowledge of languages, including English preferably, be familiar with input processing, such as indexing and abstracting, have a good knowledge of the conventional documentation systems, be flexible, and be capable of getting on with the users.

The Group indicated three aspects of the intermediary's functions and capacities requiring further development, namely, the technical aspect, which includes knowledge of the structures, content, methods of access to data bases, practical procedures for access to the network, characteristics of terminals, technical developments, and changes in the network, then the economic aspect which includes a knowledge of charges and cost/effectiveness ratios of the services, and thirdly, the user service aspect which includes the ability to create demand, to carry out a reference interview, to determine the best search strategy, to provide access to documents, to decide on the optimum amount of time devoted to a search, and to evaluate the results achieved.

The Group proposed the organization of two to four three- or four-day pilot courses in modular form, for intermediaries who are already familiar with on-line retrieval, to ensure a rapid promotion of the EURONET network and to publicize its potentialities in comparison with the existing networks. The participants would subsequently undertake promoting the network in their own countries. The four basic modules, of at least half a day in duration each would cover:

1. The technical facilities of the EURONET network.
2. Hands-on experience in particular subject areas.
3. The intermediary/user dialogue and service to users.
4. Comparative assessment of EURONET and its promotion.

The first of these courses was expected to be run in 1977.

The Working Group also recommended that with effect from 1978 in-depth subject specialized courses be given at two levels, namely, introductory and updating, in the countries with host computers.

Among the recommendations for facilitating access to the network, the Group included the preparation of a model data-base manual, of a EURONET user manual, of a data access software technical manual, the harmonization of command languages, and the development of multilingual systems. Included among the recommendations for improving the services provided is the setting up of points for contact and exchange of information between data base suppliers, intermediaries, and users, the setting up of national focal points for facilitating studies (evaluation, comparative), and the setting up of a co-ordinating point at the Community level. Finally, the Group recommended the use of audiovisual methods in the development of teaching aids and of programmed learning for promoting the use of the network.

Training of end-users

The Working Group was under the chairmanship of Mr Van Simaeys of the Université of Louvain-la-Neuve. The report, presented by Mr T. Seeger, Free University of Berlin, considered two types of end-user:

(i) the direct end-user who wishes to use the on-line system himself,
(ii) the end-user who prefers to use the system through an intermediary.

These can be further subdivided into current users and potential future users;

All the end-users will require to become aware of the significance, purpose. and operation of EURONET, the rôle, limitation and cost of on-line services, the structure, scope, and use of relevant data bases, the qualitative evaluation of data bases and of search results. The direct end-user will also require a training course including an introduction to on-line search methods, and supervised searches in one or more of the EURONET data bases.

The activities required for these purposes include a broadly based campaign to create specific awareness of EURONET, the use of mobile information and demonstration teams for promoting the use of EURONET among specific groups of current users, the provision of a set of user-orientated manuals comprising a general vademecum for EURONET, manuals for EURONET data bases, a short version of systems manuals for 'intermediary-bound' users, and a detailed version of systems manuals for direct end-users. The Group also recommended that national focal points be set up for EURONET, particularly for marketing questions, and that national advisory services be provided for rapid advice on immediate problems on EURONET.

Conclusions

Summing up, Dr T. H. Cannon, Chairman of WGTS, stated that whilst it was difficult to summarize the varied conclusions of this Workshop, the outcome of which however may be considered to have been most successful, the principle recommendations were as follows:

(i) Independently from host-computer centres and data base producers, national focal points for training should be set up (each with an Advisory Committee on which would be represented host centres, data base producers, government, industry, user organizations and teaching establishments) to evaluate and experiment with services, to provide information and advice to users, to run courses and to provide contact among users.

(ii) Pilot courses, along the lines set out in the report of the working group on intermediaries' training, should be organized in four broad subject areas each in one of the main Community languages and proposals to give these courses in 1977–78 should be invited from suitable organizations by the Commission and CIDST.

(iii) The Commission should appoint a central agent to deal with all questions on EURONET and eventually liaise with National Centres.

(iv) A general investigation of existing teaching of 'on-line' information handling should be undertaken to assess relative effectiveness of different methods, taking account of implementation with different equipment, languages, data bases and subject areas.

(v) The possibility of computer-aided instruction and on-line training in general for intermediaries and end users should be explored, including existing developments.

(vi) Taking account of the needs of sectoral groups guidelines be elaborated (including curricula, teaching methods and materials) for all types of course for the assistance of all centres providing courses (cf. UNISIST).

(vii) A register of experts be compiled and maintained from which teaching teams may be selected to provide a mobile resource for giving courses, in the first instance, to intermediaries; these experts should be supported in updating and deepening their knowledge and skills particularly in relation to EURONET.

(viii) Host centres should be encouraged to offer reduced rates for training purposes under specified controls.

(ix) Following common guidelines host centres should be encouraged to develop 'help' facilities for their on-line services.

From the present standpoint, with EURONET foreseen to commence operation at the end of 1978, it is apparent that there is much to be done in the training and instruction of information workers in order that best use will be made of it. In the lead-up period some educationalists will have to immerse themselves thoroughly in the organization of courses for end-users and information specialists if the crucial early operational phase of EURONET is to be a success.

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BRIEF REVIEW

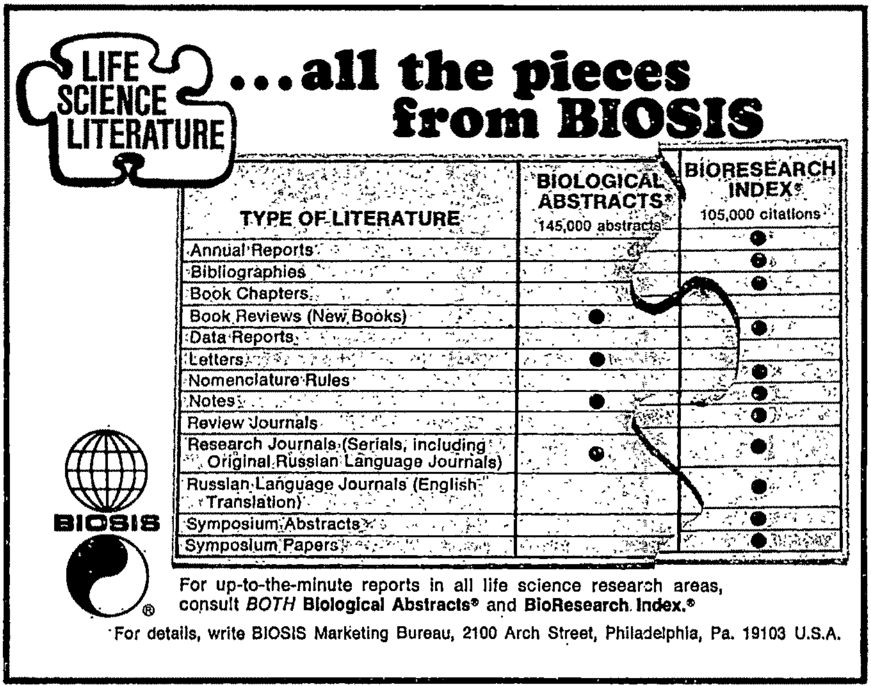
LIBRARY ACQUISITIONS: PRACTICE AND THEORY. Volume 1, Number 1, January 1977, New York: Pergamon Press. Price $45 p.a. (ISBN 0364 6408.)

The cover pages of this journal look like a very respectable research or scholarly journal but unfortunately misrepresent the contents. There are eight articles squeezed into the first thirty-two generously laid out pages. These include the editor's obligatory apologia for yet another new journal, a spoof article, an analysis of subscription payment losses, a description of new 'acquisitions hardware' (book-ends, acid-free documents storage cases, fiche cabinets) and an article entitled 'Current Awareness for Better Library Acquisitions which according to the abstract advises how . . . 'One can keep in touch with acquisitions-related developments by participating in organized activities, by monitoring appropriate publications and by informally exchanging information with both booksellers and other librarians.' Pages 33–79 are devoted to a selective bibliography of the literature of library acquisitions taken from 'Library and information Science Abstracts' and 'Library Literature'. Unfortunately the authors did not combine the two lists thus generated otherwise they might have eliminated the duplicated entries (especially the one that is listed three times in various type faces and bibliographic descriptions). New journals usually manage to solicit good articles for their first issue; if this is the best that this journal can manage then acquisitions librarians would be advised to save their £45 for something which will actually be of use to their readers. Even Pergamon seem unsure of this new journal since the order cards in the back are for the *Journal of Library Acquisitions*.

A. M. WOODWARD

Erratum

The Brief Review in the August issue should have read as follows: EDMONDS P. J. ed. Directory of technical and further education. 17th ed. London, George Godwin. 1977, 787 pp. £12.00. (ISBN 07114 34 115.) A copy is available in the Aslib Information Department.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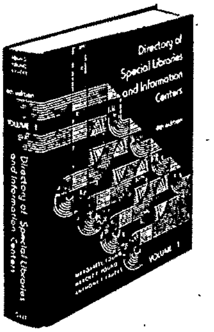

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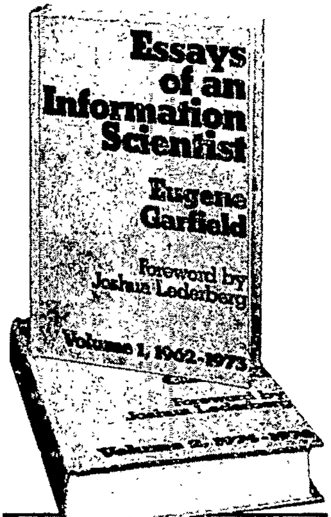
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Aslib Proceedings

VOLUME 29 OCTOBER 1977 NUMBER 10

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Aslib Proceedings *is published monthly and supplied free to members of Aslib. Annual subscription:* UK, *£22.00; Overseas, £27.00; North America, $65.00, additional copies to members, £11.00 ($30.00). Single copies* UK, *£2.00; Overseas, £2.50; North America, $6.00; members, £1.10 ($3.30).*

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Notes for contributors

Aslib Proceedings now accepts contributed papers in addition to those presented at Aslib meetings and conferences. They should be of a practical nature and of some relevance to problems encountered in the everyday operation of library and information units, or services. Other kinds of contribution which will be considered for inclusion are short notes on new information units or special libraries; the introduction of new techniques or systems in existing libraries where these may be of general interest; equipment designed by members for special purposes and put into operation in their own organizations; and objective reports on experience with new 'packaged' commercially available information services.

Contributions, which should be typewritten, double spaced, single-sided on A4 paper, and not more than 3,000 words in length, should be addressed to the Editor, *Aslib Proceedings*, 3 Belgrave Square, London SW1X 8PL. If possible, authors should include a summary of up to 200 words with the typescript. Authors will receive twenty-five offprints of their article free of charge.

Editorial

DURING THE LAST FEW YEARS Editors have discouraged the writing of papers on 'how I run my library good'. Unfortunately this has resulted in a dearth of literature on what goes on in special libraries, in spite of recent changes affecting operations, e.g. availability of external services, increased mechanization and economic constraints.

Special librarians *are* interested in what other libraries are doing and how they can improve their own services.

Several special librarians were invited to write papers for a series on Library Information Management. However, the editor would welcome articles (3,000–4,000 words) from other librarians who feel they can contribute.

A check list has been prepared to indicate the range of information required:

1. *Organization and Management:*
   - (a) Main objectives of library and information service.
   - (b) Main parameters of parent organization; position of library in parent organization; reporting chair.
   - (c) Internal organization and physical arrangement.
   - (d) Staff organization.
   - (e) Financial management.
   - (f) Performance monitoring: Planning.
2. *Services provided to users:*
   - (a) Type of service—reference, lending, retrieval, dissemination, other.
   - (b) Techniques—manual, mechanized.
   - (c) Use of external services.
   - (d) User characteristics.
3. *Special functions of Librarian or Information Manager:*
   Responsibility for publication: report editing; printing and photographic units; translation unit; patents; etc.
4. *Library publications.*

Further information is available from Margaret Raffin, Editor, Aslib, 3 Belgrave Square, London SW1X 8PL.

Library and technical information services: ICI Pharmaceuticals Division

A. R. Haygarth Jackson

Literature Services Section

Paper prepared at the invitation of the Editor of Aslib Proceedings for the series on Library Information Management

Background

THE ICI PHARMACEUTICALS DIVISION is responsible for the discovery, development, production and marketing of drugs for human and veterinary medicine. The Division is highly research-orientated with nearly 40 per cent of the employees engaged in research and development. The Division's total payroll is just over 4,000. Of these, 800 are graduates, nearly a third of whom have a doctorate.

ICI first became interested in pharmaceuticals through its Dyestuffs Division (the predecessor of today's Organics Division) in the 1930s. There already existed an historical precedent for an association between drug and dyestuffs research, on which it was hoped to build. World War II provided a major stimulus to this effort and there were some early successes. In the 1950s other valuable contributions to human and veterinary medicine were made.

The Pharmaceuticals Division itself was founded in 1957, when the Company's activities in medical research were centralized at a 350-acre parkland site at Alderley Park in Cheshire. In 1964, a new factory was opened at Macclesfield. Over 80 per cent of the Division's business is currently accounted for by products discovered by ICI. The research facilities have expanded overseas with laboratories in France and Germany. The ICI Group activities in pharmaceuticals also embody research units in the United States and Australia. An international marketing network has been established and the ICI Group pharmaceuticals sales for 1976 were £199 million.

Organization and management

The pharmaceutical industry is a knowledge-based industry and is highly competitive. There is, therefore, a demand for information. In the ICI Pharmaceuticals Division, the main objective of the Literature Services Section is to support the business by providing cost-effective access to all relevant published information and to internally reported technical information. This includes information required by the research, development, production, marketing and service functions and covers new or current information as well as old information or the prior art. Another objective is to ensure that access to and exchange of agreed information between the Division and other parts of the ICI Group proceeds efficiently.

The Literature Services Section has a staff of 28 of whom 11 work in the

Aslib Proceedings, 29 (10), October 1977, p. 337–347. Printed in Great Britain

Library and 17 in the Technical Information Unit. The policy has been to recruit a high percentage of graduate or professional staff in order to meet the technical demands of the users, so that 18 (64 per cent) of the staff have formal qualifications in science and/or librarianship. Additional training occurs on the job and by attendance at various short courses. The Literature Services Section is part of the Industrial Property Department and responds via the Head of Department to the Division Research Director.

All the prime movers in the Research Department are members of multidisciplinary Project Teams which are essentially quite independent functional units with their own research targets. The Head of the Literature Services Section leads the Technical Information Project Team whose members include representatives from main user departments, a chartered patent agent and information handling experts from the Computer Group, Data Services Section, Technical Information Unit and the Library. The Project Team has its objectives and priorities included in the Annual Research Plan and the progress of the team is monitored by the Division Research Director and his senior managers.

The Section's annual draft budget is submitted by the Section Head to higher management and the control of the expenditure from the final agreed budget is delegated to the Section Head and then to the Division Librarian in the case of library purchases.

In addition to its own facilities and sources, the Literature Services Section can call upon the information resources of other parts of ICI through the Company Information System. This is a federation of the formal information units and libraries throughout the ICI Group and other units processing information can join. It includes over thirty units in the UK, Europe and overseas and the managers of these units elect a management body of four people, known as the Information System Management Team. It is the job of this team to bring about co-operation, to co-ordinate and generally facilitate a unified Company approach to information and to enable the Company Information System and the staff to make more effective and efficient use of information as a Company resource.

Building and accommodation

In 1973, the Literature Services Section moved into a new purpose built, octagonal, four-storey library building at Mereside. This was the culmination of a five-year planning and liaison exercise with the architects and Division Engineering Department. The building accommodates the main research library reading room which occupies in effect two floors, as it has a mezzanine balcony around the periphery of the building. The reading room area is 855 square metres and the attendant library offices and link to the main buildings of the Research and Development complex occupy a further 200 square metres. The accommodation for the Technical Information Unit is on the floor below the library and comprises the reports and patents collections, a microform laboratory and offices covering a total of 415 square metres. The basement floor provides additional storage and work areas.

The movement of the library stock into the new library took place over a weekend, to minimize the period for which the library facilities were out of use. It involved over 180 trips from the old library to the new one and each round trip was a quarter of a mile, making a total distance travelled of over 45 miles. The weight of books moved was more than 40 tons and the books would have stretched two-thirds of a mile had they been placed side by side. The move was planned in detail and two techniques employed eased the operation. One involved the temporary adaption of the standard manually operated, Slingsby flat trucks into mobile stacks. Some old 7 foot shelving was cut into two parts and bolted together back to back and further bolted to the wooden floor of the trucks, so that each truck could carry 6 x 3 feet of books in shelf order. The other technique applied, incorporated an advanced run of the computerized journal holdings system (PERDEX) which indicated the location for each journal run in the new library. Before the actual move, the stock in the old library was labelled with its destined stack and shelf number in the new library and each stack in the new library contained a stock plan. This procedure allowed the stock to be completely rearranged and rehoused with the minimum of man-handling.

Policy and Philosophy

The scientific literature continues to double every ten years and no single organization can be self-supporting. In the Pharmaceuticals Division the policy has been to provide good conventional library facilities together with manual and machine access to commercially available secondary services. In addition, the specialized information collections available within the Company are fully utilized. For example, published information on the toxicology of chemical compounds has been collected for many years by the Central Toxicological Laboratory, an engineering information service is provided by the Corporate Information Unit, Head Office and the UK operating Divisions have collections relevant to their business interests. These resources are much used by the Pharmaceuticals Division but they are not sufficient by themselves.

Therefore, in areas selected for their importance to the Pharmaceuticals Division business, comprehensive in-house information services have been established. These are outlined later. It should be added that in some cases commercially available information services are used to provide some of the input, both directly and indirectly, to the in-house data bases. As an on-going policy the developments of commercial services are monitored and if possible influenced[1] to provide products which can help or replace the in-house information services.

A key feature of the design of the in-house information services is that they must make effective use of the intellectual effort involved and thus ensure that wherever possible the products of the services can be used, if so desired, throughout the ICI pharmaceuticals business worldwide. Similarly, another underlying philosophy of the in-house services is that the systems and equipment used must be flexible and versatile. Therefore, a further objective is to have the tools available to meet current requirements and also unforeseen information handling commitments that may arise. In several areas, to meet these needs, an adopt and adapt philosophy has been implemented with respect to computer software and indexing procedures. Some of these points are exemplified in the following sections on mechanization, techniques and the various services.

The information systems and the services are in the end totally dependent on people, both those providing information and those using it as a resource to their work. It is of paramount importance that the Literature Services Section works as a team, sharing tasks, so that a service does not depend on one person. There is also a policy to have deputies, often on an informal basis. In order to use the full potential of the staff considerable attention is given to career development and, so far as is possible, to succession planning.

Mechanization

The reasons for mechanizing the in-house information services have been given in an earlier paper.[2] The multi-purpose computer packages currently operating include KWIC (Key Word in Context)—and KWIC string search, ASSASSIN,[3] punch card multipunch code search system, a suite of programs to compile a special patentee index and a loans control system. Most of these programs run on the Pharmaceuticals Division computer, a Burroughs 6700. Input is generally by punch card, although for certain purposes a terminal system composed of a Burroughs TD830 input and display system and TC4000 printing terminal system is used for conversational remote job entry (CRJE).

The flexibility of KWIC has long been recognized[4] and has been used by the Literature Services Section for ten years. In fact, some of the original data has been used to generate KWIC index records on all the following computer systems: IBM 1401, IBM 360, ICL 1901, ICL 1902, Burroughs 3500, Burroughs 4700 and now Burroughs 6700! Whenever a major conversion to another computer system has been necessary, the opportunity has been taken to improve the capability of the programs. The present KWIC package is highly versatile. It provides the usual KWIC printout whereby a text of a length which can be accommodated on a single line of print is indexed at the centre of the page, the words that precede and follow the indexing keyword being displayed on the same line. Modifications include the facility to print the keyword at any position across the page or on its own as in a KWOC (Key Word out of Context) index. The multifile capability is particularly valuable and permits several indexes to be stored as a single computer file on disk pack and allows a single index or merged indexes to be output. Also searches can be confined to defined periods. If desired, instead of the KWIC type printout, a print of the accession listing can be obtained. A machine character string search facility for KWIC records uses Boolean (AND, OR, NOT) logic, allows the search for synonymous or related keywords, several concepts and/or parts of linear chemical codes. Where the input cannot be contained in one line the same accession number is used with a different alpha suffix per line of input and the string search is designed to extend across the records with the same accession number.

ASSASSIN is an ICI package conceived by the Agricultural Division in consultation with other parts of the Company and is now widely used in the UK and in Europe, both by ICI and many other organizations.[5] The package, which is extremely flexible, consists of over eighty computer programs and has been operated on the Pharmaceuticals Division Burroughs computers since 1972 as the MIDAS (Medical Information Dissemination using ASSASSIN) system. Application of the advanced machine processing techniques incorporated into ASSASSIN makes the information readily available in a variety of forms. These include SDI (Selective Dissemination of Information) bulletins, an abstract file that can be output as a numerical list of abstracts with full bibliographic details, KWOC indexes for manual search, a machine search facility and two thesauri. One thesaurus, the comparison thesaurus, is an alphabetical list of all keywords and the other, the direct-entry thesaurus, shows the relationships between terms and families of terms. At input the programs break down the title, author and other text sections into separate words which are then machine matched against a stop-word list and the comparison thesaurus. Matches are automatically indexed and in all other cases, including homographs (a keyword with more than one meaning), the words are printed out for intellectual consideration. Those that are required are re-input to complete the indexing operation and to update the comparison thesaurus, ready for the next run. The Pharmaceuticals Division Burroughs system includes re-input by terminal (CRJE). The SDI bulletins are computer typeset by an external bureau. Due to an ever increasing demand to search the MIDAS data base, an on-line interactive search facility is being planned.

In the 1950s, eighty-column punch cards and punch card sorters started to be used by information units. Many multipunch codes were developed which assigned a specific indexing feature to a given punch position. There is considerable investment in information so encoded and as card sorters are now interesting relics of an old technology, there is a need to search the multipunch codes by computer. The Literature Services Section searches patent information which is provided in this form by Derwent Publications Limited and also a data base generated in-house. Special punch card multipunch code search programs have been written for the Burroughs computer.

The programs developed for generating a patentee index incorporate several useful features. They sort patentee names into alphabetical order and priority date order. Although the main entry relates to the first issue specification (basic in Derwent terminology), the entry can be updated with the patent numbers of corresponding specifications issued in other countries. The Derwent basic number is also recorded. Finally, the subject matter prepared for input to a KWIC index is reproduced in the patentee index.

The loans control system uses CRJE and is a housekeeping tool which records the names of individuals and departments who have internal reports on loan and also library books on long-term loan.

The systems used for library mechanization are available throughout the Company and operate on an IBM 370 machine. As already mentioned the Pharmaceuticals Division takes advantage of PERDEX, which is a journal housekeeping package covering details of subscriptions, holdings, circulation, binding and disposal. A library catalogue package called LIBCAT is currently being evaluated and tested.

Microforms

In 1973 the Literature Services Section adopted computer output microfilm

(COM) as an economical medium for the presentation of large volumes of computer-generated information, e.g. the various indexes and machine readable abstracts. COM files provide rapid and easy look-up facilities without involving computer processing costs. Furthermore, COM films are cheap to reproduce and distribute, especially to overseas locations.

The decision to use microform as an information transfer and storage medium was taken as long ago as 1967 when the first 16 mm microfilm reader-printer was purchased. At that time there was a significant cost-benefit to be reaped by purchasing US patent specifications on roll film instead of hard copy. Two years later, the Literature Services Section installed an in-house microfilming unit. The present equipment includes 16 mm planetary and flow cameras with twin microfilming units, a film processor, a jacket filler, microfiche diazo duplicator and various roll film and microfiche reader-printers and readers. A microforms shredder has been purchased to dispose of obsolete film, as security of information is an important feature of the operation.

The policy at the Pharmaceuticals Division is to microfilm in-house generated material and to purchase information which is commercially available in microform. A wide range of in-house generated documents are filmed and the format of the documents varies from bound notebooks and reports to stapled and loose sheets of paper, all varying in size from the old foolscap to A5, and in addition graphs and tracings of different dimensions. Hence the need for flexibility in the equipment. Variations in format also present microfilm recording and retrieval problems. Information which is serially arranged and suitable for roll film is stored in cartridges whilst other material demanding a unit type of storage is held as microfiche. So far the emphasis has been on the filming of the entire reports collection, selected series of laboratory notebooks, alerting bulletins displaying chemical structures and old card indexes. The microfilm mileage is nearly 50 miles (excluding library purchases).

The Literature Services Section staff monitor microform developments, new equipment and techniques and act in an advisory capacity on microforms to other parts of the Division.

These mechanization and other techniques are used in the various comprehensive information services which together with the library services form the main activities of the Literature Services Section.

Library services

The Pharmaceuticals Division library system consists of four units, the Mereside Library (previously described), the Commercial Library at Alderley House and libraries at Macclesfield and Avlon (Severnside) Works. The library at Mereside is the main research library and the stock covers general reference, chemistry, biochemistry, biology, medicine and veterinary medicine. *Chemical Abstracts* on microfilm is taken, to ease congestion around the hard copy and to facilitate the copying of selected abstracts. At the peak morning and afternoon periods, some forty people can be found using this library. This library attends to much of the administration, including purchasing, for the other libraries. The Commercial Library holds books, journals, cuttings and reports on commercial and economic subjects, with particular reference to the pharmaceutical industry. This library takes the Leasco Disclosure service, which provides microfiche copies of American company reports. The Macclesfield Works Library has books, journals and reports on fields of interest to the chemists, pharmacists and other technologists on the site. Avlon Works Library holds books and journals for use by the chemists and production staff. A collection of programmed learning and audio-visual training aids is housed in the Mereside and Macclesfield libraries. A range of topics is covered, such as use of the chemical literature and specialized laboratory techniques.

A total of around 1,200 journal titles is received in the Division libraries, of which about 500 are displayed for 6 weeks at Mereside. During this time they are available for overnight and weekend loan. In the interests of most readers, every effort is made to keep journal circulation to a minimum so that most journals are always available for consultation in the library. Recommendations for purchase of new books and journals can be made by the users, and in the Mereside library some 95 per cent of acquisitions result from users' requests. Although the libraries are reasonably well stocked, there is a need to borrow from outside sources about thirty items a day. Most of these needs are met by the excellent services offered by the British Library Lending Division at Boston Spa.

A Library Bulletin is issued weekly to 270 recipients. It contains library notices and details of items added to each library during the previous week, followed by a list of forthcoming meetings and conferences of interest to the Division. Translations of technical material are arranged by the Division Librarian.

Technical Information Unit services

Technical reports

Technical Information Unit staff are responsible for the Division Reports Collection which consists of some 40,000 unique formal technical reports including certain reports issued by other Divisions and Associated Companies of ICI, and also several series of laboratory notebooks. All reports are registered by the Reports Collection staff who allocate a report number and a copy number. Each borrower is responsible for the reports issued to him and the loans are recorded, as previously mentioned, by a CRJE system which indicates the reports issued to an individual and also the holder of a particular copy of a particular report. The entire reports collection has been microfilmed. A Reports Bulletin listing new accessions is issued weekly to 200 staff.

The reports are indexed so that the Division's know-how on a topic or the work of an individual can be retrieved. The Project Team Reports which are a fundamental feature of the project team monitoring system are multidisciplinary and multitopic documents often exceeding 200 pages. Project Team Reports are indexed page by page using multifile KWIC. Other reports which are usually single topic documents are indexed using ASSASSIN and form a discrete sub-section of the MIDAS data base.

Patents

Patent information is particularly important in a pharmaceutical research organization in order that the patent situation is accurately known.[6] For alerting purposes considerable reliance is put on the abstracts published by Derwent Publications Limited, in their *Alerting Bulletins* and in the case of US specifications *Derwent Basic Abstracts Journal*.[7] These are used to compile a weekly accession listing and also a *Patents Bulletin* which is sub-divided into ten different, broad use categories. The *Patents Bulletin* has 170 recipients. Although various indexes and magnetic tapes produced by Derwent are used, they do not meet the search demands made on the Literature Services Section.

Since 1957 in-house patentee and patent subject indexes have been compiled. Up to 1968 these were manual card indexes, since then the indexes have been machine generated. In excess of 60,000 first issue patent specifications have been KWIC indexed and can be machine searched using the string character searching facility. Special features of the subject indexing include a thesaurus of use terms, a free text facility and a linear chemical fragment code, based on Duffin[8] but modified and adapted for machine search. The patentee and patent subject indexes are available as COM and abstracts in accession order are held on microfilm. A computer search or a manual search of the COM indexes is evaluated against the microfilm collections of primary alerting abstracts and full patent specifications. The patents microfilm search package is used throughout the ICI Group wherever there is an interest in pharmaceutical research.

New drugs

The journal literature on new drugs, together with the patent literature, indicates competitors activities and drug trends. Since 1962, the Literature Services Section has provided a new drugs system which contains information from 600 chemical, biochemical, biological, medical, veterinary and pharmacological journals. Some 5,000 items are added each year. The *New Drugs Bulletin* is issued weekly, each issue listing the items which are new to the system that week. The items are brief but include a compound/drug name, a chemical structure, purported use, manufacturer and bibliographic reference. Further details can be obtained from the journals displayed in the library. About 250 copies of the *New Drugs Bulletin* go to research scientists and marketing personnel within the Pharmaceuticals Division, other ICI Divisions and overseas subsidiary and Associated Companies. There are indexes to compound/drug names, biological activities, manufacturers and chemical structures via the Duffin code[8] and a computer searchable chemical fragment code.

MIDAS system

MIDAS is the Pharmaceuticals Division's use of ASSASSIN and its primary purpose is to provide the Division and its overseas marketing organization with a comprehensive information service on its products and their direct competitors. Examples of its use are to provide information required by regulatory bodies, to facilitate the preparation of technical and promotional literature and to answer specific enquiries on the Division's products.

The MIDAS system contains information from about 6,000 medical, pharmacological, biochemical, biological, veterinary and chemical journals published world-wide. The references come from 600 titles held in the Division's libraries, commercial data bases or are received via Medical Department staff from their overseas contacts. The system also includes non-published information supplied by Medical Department staff. The growth rate is about 5,400 items per annum.

The system provides seventeen weekly product-orientated SDI Bulletins containing abstracts which are distributed to a wide range of personnel in the UK and overseas markets. Product-orientated KWOC indexes are generated as COM and distributed for local manual retrieval purposes. In addition, the system is computer searchable with about 400 searches being carried out annually. As the demand for machine search is rapidly increasing, an on-line interactive search facility is being implemented.

KWIC indexes

The KWIC suite of programs is used as a general purpose tool, to generate a miscellaneous range of indexes, *e.g.* staff committee minutes, section files and section records. At present about fifty of these specific KWIC indexes are generated. The input is usually prepared by the end user in collaboration with the Literature Services Section staff, who generate the indexes.

Computerized commercial services

Outside the selected information services described above, it is necessary to fall back on the commercial services, both conventional and computer based. In general, users of computer based services are alerted to current publications of interest to them by means of search profiles constructed by a member of the Literature Services Section working in close collaboration with the end user. The profiles are then matched against the magnetic tape version of large data bases. Some of the important data bases are run as a Company SDI service, by the Corporate Information Unit, Head Office, these include *Chemical Abstracts Condensates*, the source tapes of the Institute of Scientific Information (Scisearch), *Compendex and Chemical Industry Notes.*

The development of on-line information retrieval has revolutionized the scope of retrospective search and this is a growing involvement for the Literature Services Section. In particular, on-line access has opened the door to a vast range of data bases and so has broadened the search horizons well beyond local resources.

The apportionment of the Literature Services Section staff to the various activities is given in Figure 1.

Relationships

Finally and vitally, if the library and information services are to contribute to the Division's business, the human communication systems must operate effectively both within the Section and with the users for whom the Section exists. It is important that each member of the Literature Services Section feels that they belong to a team and that their individual contribution is recognized and valued. Good relations with users is essential, so that their suggestions for improvements are carefully considered. The users must find the library and

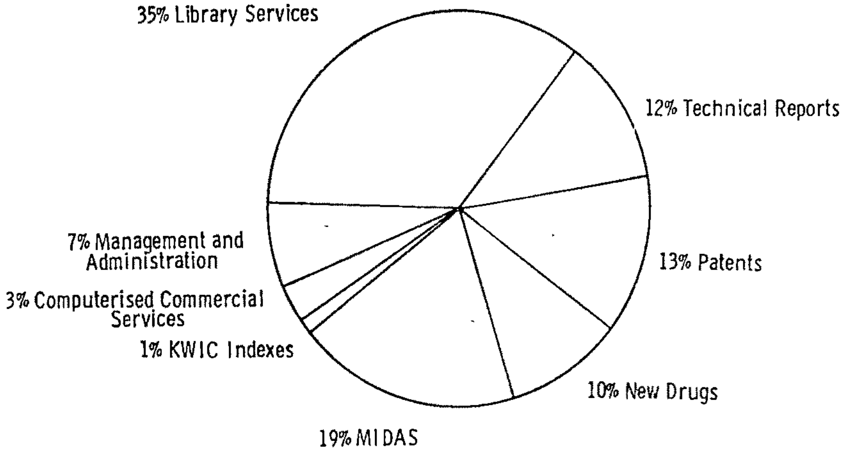

FIG. 1: *Apportionment of the Literature Services Section staff to the various activities.*

information resources easy to use and geared to their real needs. Furthermore, the user must not feel isolated although surrounded by information, he must feel that there is a friendly information staff to help him. The Project Team has an important role in this area of understanding and communication problems. In addition to fostering face to face dialogue with users, every effort is made to get the publicity right so that the information services are used.[9]

Acknowledgment

The author wishes to thank members of the Literature Services Section for their advice and comment which assisted the preparation of this paper. The Literature Services Section acknowledges the help it receives from other parts of the Division especially the Computer Group and also other ICI information units, without whose support it could not operate.

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Illuminative evaluation of user education programmes

Colin Harris

Subject Specialist in Social Welfare with the Travelling Workshops Experiment, Newcastle upon Tyne Polytechnic Library

This paper describes the adoption of an evaluation strategy—'illuminative evaluation'—by a major user education research project, the Travelling Workshops Experiment. It is argued that this project is distinctive in its similarity to curriculum innovation and dissemination projects, and it is suggested that innovative programmes cannot be subjected to preordinate evaluation. The components of illuminative evaluation are examined, and a checklist for the systematization of evaluation is offered.

SEVERAL RECENT ARTICLES and reports on user education in libraries have lamented the lack of progress made in evaluating user education or user education programmes. Few of the writers make any contribution to the solution of the evaluation problem; two important exceptions are the papers by Brewer and Hills,[1] and Fjallbrant,[2] in which a variety of educational evaluation approaches and techniques, and their relevance to evaluation of user education is explored.

Brewer and Hills conclude that:

> 'The need, then, is for an evaluative methodology which is sophisticated enough to explore the complexity of the teaching situation, including the human relationships it involves, without a serious loss of objectivity. Such a methodology must be both carefully structured and flexible. One possible solution is that of illuminative evaluation'.[3]

Stevenson also argues, albeit cursorily, in favour of illuminative evaluation:

> 'Librarians tend to assume, probably because of the evaluation methods employed on tape-slide presentations, that evaluation is very formal and involves pre- and post-tests. There are other alternatives especially of informal evaluation and these ought to be considered seriously in the context of user education, especially the technique known as illuminative evaluation.[4]

This paper describes the development of an illuminative evaluation strategy in a user education research project. It is essentially a case study, but has both theoretical and practical relevance for others attempting to develop evaluation methods.

The Travelling Workshops Experiment

The Travelling Workshops Experiment (hereafter referred to as the TWE) is a major research project based at Newcastle upon Tyne Polytechnic Library and supported by the British Library Research and Development Department. The aims of the project are to investigate travelling workshops as a means of pro-

Aslib Proceedings, 29 (10), October 1977, p. 348–362. Printed in Great Britain

viding user education and to investigate the possibility of producing learning packages for use by others. The project started in July 1975, and the present grant terminates in July 1978.

Initially, the project's research strategy was based upon the assumption that the classic social science research model was appropriate, in which sample sizes, variables to be controlled, hypotheses, treatments, tests, etc., are specified in advance. Assumptions about the appropriateness of this model were reinforced by the constant demands in the literature of user education for the formulation of specific learning objectives, etc.

When the project team started to formulate concrete plans and methods, however, it became clear that such a research model would be inadequate, for several reasons:

1. Participants in the experiment would not be selected in any systematic way. Institutions' involvement with workshops would be voluntary, as would students' participation in them. What would be important was why institutions co-operated or refused to co-operate and why students chose to attend or not.
2. Any form of control group was out of the question. The number of variables to be taken into account to form a control group was so vast that it made the task impossible. Also, to divide each participating group into an experimental group and a control group raised ethical objections and these might well have been expected to produce unco-operative reactions from lecturers and Heads of Departments in participating institutions.
3. While some attention was given to formulating specific objectives, such an emphasis proved to be misleading. The TWE is an experimental teaching programme in user education and, as such, part of its task is to discover what the specific objectives of such education should be, rather than to prescribe objectives that might prove to be inappropriate. In an experimental teaching programme it is much more important to discover how and why it does or does not work, than to concentrate on measuring intended outcomes.
4. The idea of 'piloting' or 'pilot testing' of our packages or workshops was a misconception. Workshops and packages were bound to evolve continuously, for several reasons:
    (a) No workshop team member would present a workshop in which flaws had been demonstrated without trying to correct those flaws. Thus, even if no major changes were introduced in method or format, each workshop would be different. Trivial modifications—such as volume of lecturer's voice, position of daylight screen, provision of second copies of heavily used exercise sources—could well have substantial effects on the 'success' of a workshop.
    (b) It had been assumed that changes in the format or content of workshops would be systematic and total, allowing us to compare, for example, a conventional lecture-based workshop with a self-instructional workshop. In fact, workshops were more likely to evolve from

one form into another, simply because workshops must be presented when they are required, rather than when they fit our research and production schedule. A lecture programme would not be replaced by self-instructional tape-slide programmes overnight. First, the slides might be used in lectures; for the next workshop, one tape-slide programme might be ready; for the next, that programme might be revised and another programme ready.

(c) It is not realistic to talk about 'a package' or 'a workshop'. A 'pilot-tested' workshop designed to last three days must be modified for a two-day workshop.

These doubts, expressed by the project team in the early months, were catered for by the inclusion, in its research plans, of opportunities for 'subjective assessment', but, implicitly, the classic research model was still accepted.

Lessons from other research

Two developments were necessary to liberate us from the wrong paradigm. The paper by Parlett and Hamilton on 'illuminative evaluation',[5] was brought to our attention. This was the first indication that our needs for 'subjective evaluation' might be met by an alternative, but established, research paradigm.

More important, however, was the realization of the distinctive nature of the TWE as a research project. We had been established as a *user education project*, and this resulted in a concentration upon the content of our work—what was to be taught, and how it was to be taught. Adherence to the basic classic research model was easy, because:

(a) Research methodology was implicitly accepted as subordinate to research content; although imperfect, the classic model would have to do.

(b) The project's intended audiences and judges of content—academic teachers and librarians—were assumed to be the judges also of our research methods, and it was assumed that the classic model would be familiar to them and, thus, be accepted as 'respectable.'

We are, of course, a user education project, and, naturally, this determines the content of our work. But we are an *innovation* project; the methods we use in research and development (and dissemination) are determined by this feature, and guidance must come from other projects or individuals with similar functions. Our research and development problems, and the strategies required to solve them, are those faced in curriculum development projects.

This was realized retrospectively when we started to read accounts of the experiences of other teams that had developed packages for use in any institutions. The doubts expressed by the TWE project team had already been experienced by those involved in similar projects in different settings.

The lessons to be learned from the experiences of curriculum development projects are of two kinds:

1. The advantages and disadvantages of various types of curriculum evaluation strategies, including the organization, role and components of evaluation.

2. The problems of dissemination or diffusion of the products of curriculum development projects.

Although only the first kind of lesson is relevant here, it must be realized that the TWE has much in common with many curriculum development projects in that it is attempting to produce materials that, following field-testing, may be made available for use by any institution, and stands to learn from the experiences of past projects about the organization of dissemination.

Research or evaluation?

It is not productive to attempt to formulate mutually exclusive definitions of research and evaluation. Existing definitions suggest that as concepts research and evaluation are not mutually exclusive; experience certainly supports this.

Because the TWE project has, since its inception, been complemented by (and subject to) a separate evaluation (or assessment) exercise by Aslib, there has been a temptation to regard the TWE as the centre of research activity, and Aslib as the evaluation. This is slightly misleading.

The primary role of the TWE is, of course, activity, or a set of activities—preparing packages and conducting workshops. The research component consists of determining the appropriateness of packages or workshops—the relevance of content to students' needs, the probability of packages being used by other institutions, the appropriateness of the format, etc. This is done in a cyclical process of activity and evaluation. Each workshop is evaluated as a whole, and feedback is provided, on a range of topics and by a variety of means, into the preparation of the next workshop and, of course, into the determination of the final product or outcome.

This evaluation is primarily *formative.** There is also a secondary *summative* function; the TWE team, while not attempting to *judge* its own activities or products for its audience, will present a final account of them (see Figure 1).

Aslib's role is different; the role is evaluation, and no participation in the activities of package preparation and workshop presentation is expected. Of course, the Aslib evaluator is present at workshops where evaluation data is collected both by Aslib and by the TWE. The data collected in this way is combined and fed back into the determination of subsequent workshops, as can be seen in Figure 1. Both the TWE and Aslib realize that the Aslib evaluation is of enormous *formative* value, but, additionally, the British Library's requirement of Aslib is to produce a *summative* evaluation—a final 'balance sheet' of the value and effect of the project, rather than of individual workshops.

In the course of the experiment, the TWE team and the Aslib evaluator seek to maintain maximum contact, co-operation and communication. Overall, our sources are the same people, students, academics, librarians; we use the same methods: questionnaires, observation, discussion, etc. and we have the same purposes: to provide input to the improvement and development of workshops

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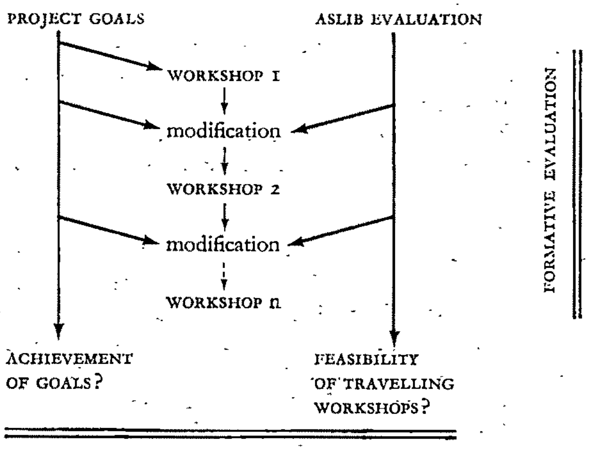
*'*Formative* evaluation is carried out during the development of a course or programme and provides direct feedback about the functioning of the different parts of a programme, thereby giving information which can be used to modify the educational process.'

'*Summative* evaluation is concerned with the evaluation of the educational programme as a final product.'[6]



SUMMATIVE EVALUATION

FIG. 1: *The research/evaluation process*

or packages. The evaluation activities are similar, but the distinctive role of the Aslib evaluator should be understood:

1. The Aslib exercise is formally independent of the TWE and is *impartial.* Whatever types and levels of co-operation exist during the project, the Aslib evaluator will retain his independent and impartial judgment.
2. The Aslib evaluator is physically remote from the TWE. Despite the necessarily limited amount of contact possible, this has two important advantages:
    - (a) He does not get involved in day-to-day problems and activities. His ideas and judgments are, therefore, possibly less biased.
    - (b) He moves in different circles. He is, therefore, able to provide information about the TWE to people or institutions with whom we have no contact, and to provide us with information that might otherwise elude us.

Evaluation methodology

Having introduced the term, it must be pointed out there is no *single* evaluation methodology; even in the field of curriculum evaluation there are several distinct methods.[7] Two of them, in fact, have their roots in the classic research model:

1. Comparative evaluation, in which two or more programmes or elements of programmes are compared to decide which is, in some specified sense, better than others.
2. Normative evaluation, in which a programme is examined in relation to prescribed normative criteria-objectives.

Both these models are preordinate—they prescribe in detail the objects of evaluation, the methods to be used, and the criteria by which success is to be measured. They both emphasize *intended* outcomes and are likely to ignore others, and are probably not suitable for evaluation of innovation. As Harlen put it:

> 'When put into practice, this classical experimental model, which seems logically attractive, fails to give the information which is most useful for either formative or summative evaluation. What makes it so attractive and reasonable is precisely its weakness: it is part of an oversimplified view of curriculum development as "identification of objectives, planning of learning experiences, evaluation", which ignores the characteristics of the learning environment, and the interaction of learners and teachers with that environment, both in the development and in the evaluation stages'.[8]

A third kind of evaluation has been proposed, illuminative evaluation. The phrase was coined by Trow[9] and its main proponents in Britain are Parlett and Hamilton:

> 'The aims of illuminative evaluation are to study the innovatory project: how it operates; how it is influenced by the various school situations in which it is applied; what those directly concerned regard as its advantages and disadvantages; and how students' intellectual tasks and academic experiences are most affected. It aims to discover and document what it is like to be participating in the scheme, whether as teacher or pupil; and, in addition, to discern and discuss the innovation's most significant features, recurring concomitants and critical processes. In short, it seeks to address and to illuminate a complex array of questions'.[10]

The formulation of the illuminative evaluation approach owes much to established methods in social anthropology and sociology, particularly participant observation. It also reflects a current search in social science for a methodology that will facilitate understanding of contextual meanings of social behaviour (such as ethnomethodology in sociology).

Illuminative evaluation is clearly suitable for evaluating programmes of innovation, such as TWE; this is confirmed by the experiences of the project team and Aslib so far.

Components of illuminative evaluation

> 'Illuminative evaluation is not a standard methodological package, but a general research strategy. It aims to be both adaptable and eclectic. The choice of research tactics follows not from research doctrine, but from decisions in each case as to the best available techniques; the problem defines the methods used, not vice versa'.[11]

Researchers (or evaluators) then, have two problems: first to select the appropriate methods or combination of methods and, second, to use those methods adequately. The range of methods is, in effect, infinite. Parlett and Hamilton suggest observation, interviews, questionnaires and tests and documentary and background information.[12]

The illuminative evaluation strategy may include the use of quantitative methods. Many of those who have criticized quantitative techniques accept that they may still provide useful information.[13] It is sole reliance upon such methods that is criticized; indeed, when used in combination with other techniques, these methods may be used to check the findings of such techniques.

Other writers suggest other methods, any of which may be used in the illuminative evaluation strategy. Case studies,[14] observation schedules,[15] interaction schedules,[16] participant observation,[17] legal models,[18] decision theory,[19] 'eco-behavioural measurement'[20] and many others have been suggested. (A particularly useful outline of techniques is presented by Steadman.)[21]

The choice of methods is not an easy one. Many of the methods are well established, but some are difficult to grasp. It is easy to rationalize not coming to grips with them simply by acknowledging that it is impossible to be a master of all trades. Nevertheless, Tawney's advice undoubtedly refers implicitly to methods additional to those that he specifies:

> 'In the constraints imposed by a curriculum development project, the small samples and the limited time available, it is difficult to get statistically reliable results from the classical design of pre- and post-testing, experimental and control groups, and not usually worth the effort.'[22]

It is probably not fruitful, in the absence of existing expertise within the team in decision theory models or legal models or whatever, to attempt to develop those models within the short period available. It is certainly not fruitful if use of such methods will cause scepticism among the project's audience. On the other hand, it has been argued that the methodological antecedents of illuminative evaluation have developed more rigorous standards of data collection and validation, hypothesis generation and testing, model building and data presentation than Parlett and Hamilton offer.[23]

In retrospect, then, it appears that the TWE project team have done the right things. Either intuitively, or on the basis of limited experience in workshop organization, we were aware of most of the problems that others involved in similar projects had faced and spent time attempting to solve. We knew that an obsession with objectives would be unproductive, that our research should produce insights rather than test hypotheses.[24] We did place too much emphasis upon pre- and post-tests, which we have been forced to reconsider. We did not attempt any very elaborate techniques, and we feel justified in not having done so.

What we have done, however, is rely deliberately and heavily upon 'subjective assessment'. This combines Parlett and Hamilton's two methods of observation (of how workshops work) and interviews (with participants and others), the latter being unstructured. In fact, early subjective assessment was unstructured in the sense that no guidelines had been set by the project team, either as a matter of policy (*i.e.* to gather comparable material by all three subject specialists) or as a practical aid.

The literature of evaluation research is full of warnings that observation and other subjective techniques may be penetrating and insightful, but they may be slack, dull, irrelevant and confused. We appreciate this, and we have produced the appended checklist of activities, methods, sources, etc., to help us in our own evaluation, both in the selection of 'hard' and 'soft' techniques, and in the use of the latter. Before methods are selected and used, however, evaluation researchers have to make decisions of two types:

1. What will the evaluation do?
2. How will the evaluation be done?

The first type of decision relates to questions as to whether the evaluation should be value-free, formative or summative, goal-based or goal-free, and about the evaluation's intended audience, etc. The second type of decision relates to the events or contexts being evaluated, techniques to be used, and the actual content of the evaluation activity.

Is evaluation value-free?

> 'Evaluation research always involves a *judgement of the worthwhileness* of some activity. At the outset, therefore, it is quite different from the explicitly value-free position of experimental research.'[25]

In formative evaluation, information gained at one stage (workshop) is fed back into the programme to improve performance at the next stage (workshop); evaluation is constantly used as a basis for decisions about content, format and techniques. These decisions inevitably involve considerations of the worthwhileness of aspects or activities in a workshop as a whole.

Is evaluation to be formative or summative? (see footnote, p. 351)

In effect, an evaluation programme is unlikely to be entirely formative or entirely summative. It is important that researchers or teachers (or librarians) should be aware of the role that they expect their evaluation to perform.

Is evaluation goal-based or goal-free?

Experimental teaching projects are bound to have goals, and they are usually made quite explicit. The goals should be broad, but clear. They should be broad because it is in the nature of an innovatory activity that concentration upon prescribed, narrow objectives will fail to provide information on potentially more significant outcomes. They should be clear because researchers must know what they are doing and why. Most important, however, they must be *flexible*. Research activity should bear project goals in mind, but formative evaluation will quite probably precipitate goal changes or modification.

What should the evaluation exclude?

Questions about what can feasibly be evaluated will be asked in the context of evaluation techniques. More fundamentally, there is a question of whether any factors should be deliberately excluded from evaluation, either on the basis of lack of relevance or on some other criterion, such as political sensitivities. Generally, an open mind must be maintained on relevance. Illuminative evaluation will seek to ask any questions that will provide information useful to the development of the project or activity, and accepts that such information may come from any of a vast range of sources. Political sensitivities can have an immense effect upon the success of a project, both in development and diffusion or dissemination stages. The temptations to ignore them, or to ignore institutions manifesting them, must be avoided; their effects must be discerned and the means found to overcome them.

Techniques and content of evaluation

As stated earlier, there is no single evaluation methodology; neither is there any common conceptual framework for evaluation. The question of *what* is being evaluated is a thorny one.

Perhaps the most relevant conceptual framework has been suggested by Stake.[26]

> 'According to it we may collect data about the rationale, the philosophy, what the program is. We may collect data about antecedent conditions, and about classroom processes that I call transactions. We may also collect data on the outcomes of the program. And I have a categorization . . . in which I identify things that are intended, things that are observed, things that can be called educational standards, and things that serve as judgements.'[27]

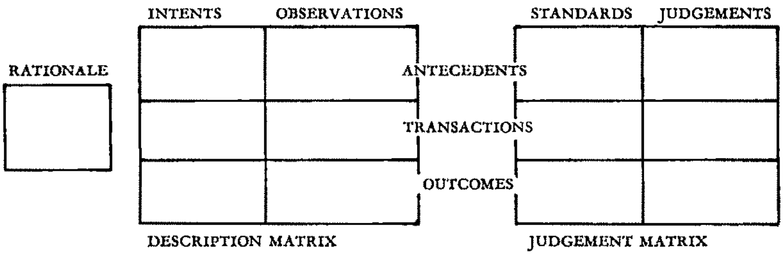


FIG. 2: *'A layout of statements and data to be collected by the evaluator of an educational program' (Stake).*

PROGRAMME RATIONALE	Data for the evaluation of an educational programme			
	Intents Sources	Observations Sources	Standards Sources	Judgments Sources
ANTECEDENTS: Student characteristics Teacher characteristics Curricular content Curricular context Instructional materials Physical plant School organization Community context				
TRANSACTIONS: Communication flow Time allocation Sequence of events Reinforcement schedule Social climate				
OUTCOMES: Student achievement Student attitudes Student motor skills Effects on teachers Institutional effects				

FIG. 3: *Stake's detailed data collection matrix.*

Figure 2 shows this framework in graphic form and Figure 3 shows how it can develop into a matrix for data collection. Stake is adamant, however, that the matrix should not be inflexible:

> 'These are just simple reminders of what sort of data could be gathered in an evaluation study. These are mind-stretching, as I see them, reminding us of some things that our common sense impulses fail to remind us of'.[28]
> '. . . categories should be used to stimulate rather than subdivide our data collection'.[29]

This is important. Any framework that aims to accommodate all relevant information will either be so comprehensive as to provide no guidance, or will itself place limits upon the types of information that are sought. This problem is partially solved by the nature of evaluation research. The questions the evaluation researcher asks himself are not likely to be answered by 'yes' or 'no'. They are likely to ask 'how', 'why', etc. the researcher can bring any relevant information to bear, even if it is not of a type or from a source specified in the framework.

Stake's basic framework seems, in many ways, well suited to the evaluation of workshops. The tripartite division into antecedents, transactions and outcomes is useful, although the boundaries are sometimes transcended. For example, 'a social welfare workshop at Liverpool Polytechnic' may be taken to mean the actual two-day programme, in which case arrangements to run the workshop constitute an antecedent; if, however, it is taken to mean the entire act of organizing and running the workshop at Liverpool, then aspects of the arrangements to run the workshop—such as approaches to and communication with librarians, the head of the Department of Social Work and Social Work Lecturers—constitute transactions.

It also seems likely that not all observations and judgments can have, respectively, corresponding intents and standards, particularly in a project that deliberately does not attempt to be totally preordinate. This is awkward, since it is Stake's intention that data gathered in these categories is then examined for 'congruence' between intentions and actual observations. Nevertheless, while the provision for statements of intentions allows for an ordered portrayal of what is intended, illuminative evaluation must allow for hindsight—an observation can cause surprise, not necessarily because 'one *did not expect* this to happen' but because 'one *would not have expected* this to happen'.

This need not be a problem. The framework should serve as a constant reminder to the researcher of the activities and conditions and events that may occur; it is intended to systematize observation and judgement so that, in the case of the TWE,

(a) each evaluation of a single workshop will be recorded, as a case study, as fully as possible, and
(b) comparisons between workshops undertaken by three separate researchers will be more readily facilitated.

We have used Stake's basic framework, but we have modified it to meet our needs. In the appended checklist, the categories of antecedents, transactions and outcomes have been expanded to specify all characteristics, environments, events and behaviours that we believe to be relevant in evaluating workshops.

The checklist can be further expanded as a result of further experience, or modified to suit other programmes. We have also indicated the sources and methods of data collection that we think are appropriate in each case. Intents are not always specified, since this would have the same effects as overconcern with objectives. It is assumed that evaluation of the event at the observation stage can take note of intents, if any, and *expectations*, if any. Similarly, judgments have not been specified, since they are not seen in our conception of evaluation as totally separable from observation. An awareness of the hybrid nature of evaluation—observation + judgment—is called for.

It is worth emphasizing that the purpose of this checklist is to serve as a reminder to team members in their evaluation activities; it is intended to enable them to draw as complete as possible a picture of each workshop, to absorb systematically and fully all the available data that can be used to improve, in any way, future workshops, and ultimately to ensure that our packages can be used effectively and productively.

Conclusion

This approach was developed and used in the formal context of a research project, but this does not reduce its relevance in user education generally. Librarians who are continuously involved in user education need to evaluate regularly what they are doing, because the same instructional approach might not be appropriate with different subjects, or with different lecturers or in courses with different teaching methods, or with classes of different size or with students of different age or level.

Librarians or others will never develop the necessary instruments to *measure* precisely the contributions of such a variety of factors to the success of a programme. It is more necessary to be aware of the potential influence of all factors and to be able to make informed guesses about their contributions. Progress will come more quickly in this way, and, increasingly, librarians are looking to 'illuminative evaluation' to help.

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APPENDIX

Checklist for evaluation

	SOURCES					METHODS			
	STUDENTS	ACADEMICS	LIBRARIANS	OTHER PEOPLE	DOCUMENTS	TESTS, ETC.	QUESTIONNAIRES	DISCUSSION	OBSERVATION
ANTECEDENTS									
1. Characteristics of student group									
Course and year		×						×	
Age/experience	×						×		
Mother tongue	×						×		
Number in group		×						×	
*Relationship with each other	×							×	×
*Student attitudes	×						×	×	
2. Characteristics of academics									
Position		×					×	×	
*Relationship to students	×	×						×	×
*Relationship to librarians		×	×					×	×
As library users		×						×	
Background, etc.		×			×			×	
3. Characteristics of librarians									
Position			×					×	
*Relationship to students	×		×					×	×
*Relationship to academics		×	×					×	×
As teachers			×					×	
Background, etc.			×		×			×	
4. Curriculum content									
Dissertation project	×	×			×		×	×	
Research methods	×	×			×			×	
Library instruction	×	×	×		×		×	×	
*'hidden curriculum'	×	×						×	×
5. Curriculum context									
Time available for workshop		×	×					×	
Co-operation/relationships	×	×	×	×			×	×	
External constraints		×	×	×	×			×	×
Library stocks and services		×	×		×			×	×
6. Physical accomodation									
Size and suitability		×	×					×	×
Proximity to library, etc.									×
7. Existing knowledge	×	×	×					×	
Pre-test score	×					×			

* Examples of instances in which most data will be gathered retrospectively in Transaction stage.

Checklist for evaluation (cont.)

		SOURCES					METHODS			
TRANSACTIONS		STUDENTS	ACADEMICS	LIBRARIANS	OTHER PEOPLE	DOCUMENTS	TESTS, ETC.	QUESTIONNAIRES	DISCUSSION	OBSERVATION
1. Understanding of purpose, including		×							×	
appropriateness of timing		×	×						×	
2. Publicity		×	×	×	×				×	×
3. Overall method		×	×	×				×	×	×
4. Instructional materials and methods										
Handbook	Quantity	×	×	×				×	×	×
Lectures	Comprehension	×	×	×				×	×	×
A.V. programmes	Relevance	×	×	×				×	×	×
Exercises	Motivation	×	×	×				×	×	×
Displays	Interest	×	×	×				×	×	×
Graphic instruction	Quality	×	×	×				×	×	×
Literature search	Formal/informal	×	×	×				×	×	×
Tests	Theory/practical	×	×	×				×	×	×
5. Equipment and other hardware										×
6. Internal arrangement of workshop										
Conceptual										
Physical		×	×	×					×	×
7. Student attendance										
Pre-test										×
Post-test										×
Pre- and post-test										×
Introductory lecture										×
Average attendance										×
Time-tabling		×	×	×		×			×	×
8. Student activities										
Working systematically through workshop		×							×	×
Browsing		×							×	×
Correct use of materials		×							×	×
Working on own project topic		×							×	×
Not working		×							×	×
9. Relation of workshop to project, etc.		×							×	
10. Relationships between students		×							×	×
11. Academic staff attendance										
Numbers										×
Departments			×						×	×
12. Academic staff activities										
Materials			×						×	×
Students		×	×						×	×
Other (workshop tutor, librarians, etc)		×	×	×	×				×	×

Checklist for evaluation (cont.)

	SOURCES					METHODS			
	STUDENTS	ACADEMICS	LIBRARIANS	OTHER PEOPLE	DOCUMENTS	TESTS, ETC.	QUESTIONNAIRES	DISCUSSION	OBSERVATION
13. Librarians' attendance									
Number			×						×
Department, etc.			×					×	
14. Librarians' activities									
Materials			×					×	×
Students	×		×					×	×
Other (workshop tutor, academic staff, etc.)	×	×	×	×				×	×
15. Other attendance									
Library schools				×				×	×
Other departments				×				×	×
16. External organizational factors									
Transport									×
Catering									×
OUTCOMES									
1. Student achievement									
Test	×					×			
Academic work, inc. dissertation	×	×						×	
2. Student attitudes	×						×	×	
3. Academics' attitudes		×					×	×	
4. Librarians' attitudes			×				×	×	
5. Student behaviour									
Library use	×	×	×				×	×	
6. Academics behaviour									
Teaching methods	×	×	×				×	×	
User instruction		×					×	×	
Use of packages		×			×		×	×	×
7. Librarians' behaviour									
User instruction			×				×	×	
Use of packages			×		×		×	×	×
Other—displays, etc.	×	×	×				×	×	×
Acquisitions, library management	×	×	×				×	×	
Relations with students	×		×				×	×	
8. Consciousness raising									
Course development	×	×	×		×		×	×	
Academic/librarian co-operation		×	×				×	×	
9. Spin-offs									
Library staff training			×				×	×	
Library schools staff and students				×			×	×	

Unit times in studies of academic library operations

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Introduction

IN RECENT YEARS various articles have described the results of work study exercises in libraries.[1,2,5,8,9,10] Smith and Schofield see one of the advantages of these studies as offering inter-library comparisons.[1] This article is offered as a further contribution towards this end.

It may be helpful to add one more library's experience in this field as, increasingly, there appears to be developing a consensus, or, at least, a range of unit times which are not so disparate as to preclude their use, if only for purposes of comparison, in other situations.

Unit times are more valuable than unit costs in that the latter may change more rapidly and are, naturally, derived from the former. Various similarities in the data quoted in the surveys occur, *e.g.* book-ordering consumed 11.4 per cent of our Central Services (technical processes) time in 1974 and 13.9 per cent in 1975 compared with Newcastle's 11.7 per cent.[2] The cataloguing process also reveals some similarities. The unit time is roughly (and variously) 28 minutes per item at Liverpool and about 26 minutes at Newcastle.

Liverpool Polytechnic Library Service has conducted several studies since 1972—October 1972 in the Engineering and Science Library, May and June 1974 over the entire system, May and June 1975 on part-time and temporary staff and the work of the Central Services Unit, June and July 1975 again over the entire system. The objectives of the studies were to:

1. Obtain unit times for all functions and tasks performed by library staff.
2. Derive unit costs for all tasks and functions.
3. Identify possible economies of scale.
4. Identify the cheapest method of performing tasks for which various methods exist at present.
5. Define the maximum workload capacity of the library and of its sections at present staffing levels.
6. Identify the variety of tasks performed by library staff.

It must be admitted that we have been more successful on objectives 1, 2 and 5 than on the others.

For ease of comparison we adopted Pritchard's excellent list of codes.[8] It would be extremely helpful if a list such as this could be adopted by libraries. Pritchard's list does seem to strike a nice balance between too great a degree of specificity or generality.

Where Liverpool data is not given this is either because the number of items

Aslib Proceedings, 29 (10), October 1977, p. 363–380. Printed in Great Britain

was too small for confidence or the task is not normally undertaken, *e.g.* having a computerized cataloguing system the only sorting of cards is associated with vertical files and similar items and withdrawals from the former manual catalogues. Where data from other surveys does not conform exactly with the codes used the approximate equivalents are given—for instance some studies give a time for the entire cataloguing or processing system rather than the several stages within these.

The 1972 study used work sheets where the participants recorded a brief description of each task undertaken, the procedures adopted, the time taken and the quantities involved. Quantities are, obviously, essential; however, they can be neglected unless there is close supervision of recording. Greater attention was given to this in the later studies. Many tasks either do not require quantities to be recorded, *e.g.* sick leave, as they are either obtainable from other sources or are irrelevant. However, one has two choices on others. One can either accept the time taken during the duration of the study for a task and gross this up to an annual, or similar, total time, probably making this relative to another indicator (say acquisitions), or one can attempt to count the number of occurrences of the event (amendments, insertions, booksellers reports, etc.) over the longer time period. In the later surveys counts of items processed were made by the staff concerned at the time of recording the activity, thus we were able to relate units of work produced to individual staff members. This was not for the purpose of individual assessment but did indicate the variations likely on identical tasks performed by different individuals. The range of times found in this way gave more confidence in adopting, or calculating, a mean for each activity. Where counts are made once daily rather than at the time undertaken these deviations may be hidden. Extreme deviations may indicate that two different tasks have been coded as a single task, in which case an investigation can be made, or may simply reflect individual staff differences. Standard deviations were not calculated.

The 1974 study used a system of coded tasks for recording. The use of codes for tasks was discontinued in the 1975 study as many staff were unable to memorize them all (including their definitions) and lacked both the time and the patience to look them up in the lists. (Examples and information on the codes are obtainable from the author.) Professional staff checked the verbal descriptions to ensure correctness and lack of ambiguity. In some respects this allowed a cross-comparison within groups of staff. Where one staff member timed and quantified each element of a task or series of tasks these could be aggregated for comparison with another record where a broader more inclusive description had been used (*e.g.* on 'processing'). Actual times of starting and completing tasks were recorded rather than adopting a system whereby the day is divided into equal time intervals. It was felt that the latter introduced too many distortions and could confuse staff. It seemed easier to the staff to simply consult their watches. This had some positive advantage in that interruptions were more easily identified.

The 1974 survey provided an analysis via the computer. This analysis included the proportions of each task which were performed by qualified staff. This is not to say that the proportions are 'good' or 'ideal'. Many reflect the staffing situation at that time and the small site situation where professional staff are obliged to undertake some clerical duties. The program was also intended to provide data on the proportion of each staff members overall time devoted to each task. Unfortunately there was a 'bug' in the program and we failed to obtain this data. It is very helpful to obtain both 'within task' and 'within grade' proportions. The 'within task' proportions of professional time have altered somewhat since 1974. Cataloguing (code 62), other than for difficult items and checking, is now almost entirely a clerical operation. The four surveys covered some 705 man-days.

There are weaknesses in all the studies only too well known to, and acknowledged by the authors. Unit times are not available for all library operations. Professional activities especially are elusive to quantification. The variety of tasks also tends not to be comprehensively listed. Clerical and routine procedures are relatively easily described but items such as 'reading memos', 'writing reports' may be subsumed under general headings. Similarly discovering the number of memos read or reports written, over time, can be difficult. The time taken in discussion, liaison, meetings and merely being seen about the place may not be sufficiently tangible or self-evident. In all the studies, task elements have not been treated at the 'first-generation' level (*e.g.* grasp, reach, etc.) but are more akin to third generation or second generation limited higher orders.

'The use of higher level systems indicates that these times do in practice represent a weighted average and that inaccuracies can reasonably be expected to balance out over a whole task. . . .'[3] A work study engineer would see these methods as a starting point but they would not satisfy a purist.

It is recognized that unit times represent means and that there will be deviations about the mean. Measured at another time with different staff members the results will be different too. However, one would not expect such differences to be vast. Similarly the net error in such figures may be relatively low in that though gross error may be large a great deal of error cancels out. These figures can only be regarded as indicative but better than 'guesstimates'. But they are not 'standard times'.[4] Gilder and Schofield say we should 'accept the resultant measures as indicators rather than precise standards.'[5]

The Department of Employment Tripartite Working Party discussed the problem of the 'average': 'There can be no completely objective or scientifically correct time for a complete task. . . . There are many difficulties and possible errors, both human and technical in arriving at "standard performance".'[6]

So, librarians can be somewhat excused. Nevertheless some form of agreement on definitions and interpretation would seem to be necessary if comparisons between institutions are to be made. The unit times also reflect what is done rather than what ought to be done. For example, greater care and hence time may be necessary on some tasks but pressure of work prevents this. An ideal staffing situation is unlikely (and itself is relative) so one can regard the unit time as variable too. Measured at different times, under different circumstances, it may be different even though the objective description of the task remains unchanged. 'Standard times' assume 'normal conditions'! One objective of work study is to improve the method. Predetermined motion time systems claim to be better able to do this although not all work study people would wholly subscribe to this view.

The surveys discussed here do not always make it clear whether the times refer to 'improved' or 'unimproved' systems. They may simply be statements of what was. Smith and Schofield recommend recording the less regular or unusual activities—their secondary rather than primary tasks. They also advocate the encouragement of self-recording by all grades of staff. It is my hope that an attitude will develop to work which, among other things, sees the recording of the quantity of work done and the time taken as a natural part of any work—a kind of personal feedback on the job.

Masterson points out that the timing of the surveys also affects the results obtained.[7] Ideally one needs to conduct sample surveys throughout the year and repeat them, or parts of them, at regular intervals thereafter both to reconfirm previous data and to cover progressive changes in working methods. The City of London Polytechnic survey (COLP) was carried out in the vacation.[8] There may be considerable differences between the results of term-time and vacation surveys.

Pritchard and others have calculated the **available working time** (AWT) applicable to members of staff.[8] These are usually given as total hours or minutes available in the year. Smith and Schofield, and Newcastle, used the concept of primary task time (PTT)—that time available for the primary or special duties of staff as opposed to the shared and common tasks. Pritchard uses 1,630 hours per annum as AWT. This figure can then become the divisor for staff calculations. The College of Education Libraries Research Project (CELRP) adopted 1,500 hours per annum for professional staff and 1,550 hours for clerical staff.[9]

This idea of 'available working time' is closely involved with and related to the work study engineer's 'relaxation allowances' which would normally be built in to 'standard times' per operation or task. In the library studies these allowances are calculated on an annual hours basis, being deducted before other calculations are made.

Smith and Schofield suggest allowances of from 12½ to 16 per cent for tea and office breaks, fatigue, personal needs and waiting time. The Newcastle study suggested an approximate range of from 12½ per cent to 13 per cent but did include tea breaks in available working time.

At Newcastle some 21.2 per cent of **total time** was lost to sickness, leave, breaks, etc. The percentage at Liverpool was 23.5. The Newcastle study arrived at a figure of 1,687.5 hours of available time per annum (45 × 37.5) but this includes the relaxation element. Agreement should be reached, as advocated by Smith and Schofield, on such figures. It can be seen, in sources, that total annual hours vary from 1,200 to 1,800. Calculations of the number of staff required will obviously vary enormously.

Calculations made at Liverpool suggest that some 9.8 per cent of total time is taken up by leave and a further 13.7 per cent on 'personal needs' (breaks, sickness, etc.). Thus only 76.5 per cent of the working year is available for professional work and some 77.7 per cent for clerical staff. Local circumstances, policy on leave and bank holidays, may affect the figure as far as individual libraries are concerned. However, it appears to me that approximately 1,460 hours for a professional member of staff and 1,480 hours for a non-professional staff member are the maxima one can reasonably expect, allowing for relaxation. The differences in the data may simply reflect differing methods of allowing for absences and relaxation—at the level of gross annual time available, or having calculated 'available working time' then subtracting the 'relaxation' element.

Williams studied the various practises in calculating **relaxation allowances** and has developed tables for use in the Imperial Group.[11] These allowances are grouped under headings:

1. Standard fatigue recovery allowance.
2. Physiological factors.
3. Psychological factors.
4. Environmental factors.

Librarians may be more interested in the third of these which covers discipline, monotony and concentration. A validation test averaged 17.5 per cent relaxation allowance per job studied. The Scott Mulligan Data system, sometimes used for clerical operations, includes a relaxation allowance of 16 per cent in the element times.[12]

In addition to 'relaxation allowances' industry recognizes that 'incidental delays' also occur typically involving from 2½ per cent to 10 per cent of the

		Liverpool		*CELRP Libraries (A,D,E,G)**
Code	*Description*	*Professional % of task* (1974)	*Unit time (mins)*	
04	Reading reports, memos, correspondence		8	
07	Timetabling	93		
08	Opening mail		1.2	
09	Gathering management information	73		
10	Stationery, checking, requisitioning, per item	36	1.8	
11	Liaison	79		6.25 hrs per internal committee. 2.5 hrs per external meeting
12	Individual instruction (in use of catalogue, per student, p.a.)		10	39 27 65 23 (mins)
13	Meeting visitors	100		

* A, D, E and G refer to individual libraries studied. See text reference 9.

TABLE 1: *General categories*

Code	Description	Liverpool		COLP	CELRP	CLMRU	Newcastle
		Professional % of task	*Unit times (mins)*	*Unit time (mins)*	*Unit times (mins)*	*Unit times (mins)*	*Unit times (mins)*
14/15	Current awareness	62	0.66		20 hrs per revision. 30 hrs per new publication		
15A	Displaying new books per book		0.5				
16	External enquiries						
17	Internal enquiries (staff & students) per enquiry		14		75 mins per reader p.a. (includes some of 12)		
17A	Periodical enquiries per enquiry		8				
18	Issue desk duties per transaction/item, charging, discharging, minor enquiries, renewals, registration		3.3		4.5 mins per issue (includes 25)	10 mins per issue. Library Q 4 mins per issue (includes 28). Library R	
20	Issuing and receiving books per transaction	5	0.8 (discharging)		*c.* 2 mins (includes 24 and 28)	0.66	1.5

23	Conversion to Browne issue system			1			
24	Reservation per item	34	5.2	4	A D E 14.4 5.5 9.1		13.5
25	Inter-Library Loans		13.5	15	A D E 20.5 16.8 14.7 G 23.7	100 Library Q 71 Library R	34
26	Shelving per book		0.75	0.87 (code 110)	2.2 (includes 36)		
27	Shelf revision per book	56	0.08				
28	Sending overdues per overdue	8	2	2–3	A E G 0.1 0.1 0.3		5
29	Final letters				3		
29A	Account queries		20				

TABLE 2: *Services, counter routines and enquiries*

Code	*Description*	*Liverpool*		*COLP*	*CELRP*				*CLMRU*	*Newcastle*
		Professional % of task	*Unit times (mins)*	*Unit times (mins)*	*Unit times (mins)*				*Unit times (mins)*	*Unit times (mins)*
					A	D	E	G		
31	Photocopying per page	21								0.6
34	Periodicals: acquisition	10	2.1		8.69	2.42	5.75	1.19		
	Display shelving									2.2
	Chasing	16								
	Ordering	37								
35	Binding per volume	62							7 Library Q	4.8
36	Stock editing per book				2.2 (includes code 26)				8 Library R	
37A	Vertical file material: per item		3							
40	SDI Services	11								
41	AV catalogues file maintenance per item		3.3							
44	Indexing periodicals		3.1	3.5						
46	British and International standards			12						
50A	Inserting loose-leaf amendments. Per page		0.9							

TABLE 3: *Periodicals, etc.*

total time. Similarly relaxation allowances between 10 and 20 per cent are often found. 'A basic allowance of 8 per cent can be considered satisfactory . . . working sitting down. . . . If concentration is important one can add between 2 and 5 per cent. If the operation is of very short duration (*e.g.* 10 seconds) then an allowance of 2–5 per cent is made to provide relaxation from monotony.'[13] A contingency allowance of up to 5 per cent for uncontrollable factors (*e.g.* queries) is also applicable. A relaxation allowance of about 16 per cent does not seem unjustified.

The unit times and other data are given in Tables 1–6. They are largely self-explanatory; however, one or two points could be made. For example Smith and Schofield on inter-library loans in their library 'Q' (Table 2, code 25), state that inter-library loans (ILLs) over a 3-month period were 549, with a unit time of 100 minutes.[14] This suggests a primary task time (PTT) per staff member in the region of 1,220 hours. At Liverpool, in the financial year 1975–6, 11,000 inter-library loans were handled with two, full time equivalent, staff. There may be differences in interpretation here or the possible greater reliance of Liverpool on one primary source in the British Library Lending Division may account for the discrepancy. Similarly 80 per cent of our requests are photocopies. The university situation may well be considerably different.

Kirk gives some useful data derived from studies of university libraries on reshelving.[15] Table 2, code 26, shows 0.75 minutes per item at Liverpool. Reworking Kirks' data gives a rough 1.28 minutes per book for the universities. This difference can, possibly, be explained by the larger collection sizes of the universities and the likelihood of the presence of closed access areas. 'Sending overdues' shows some variation; however, an explanation may be offered. The low figures quoted in the College of Education Survey may be due to 'overdues' being internal mail only.

Within 'ordering' (Table 4) the Liverpool data shows that writing orders is a 61 per cent professional task. This is the consequence of professional staff, partly through convenience but probably mainly through necessity, writing orders during the selection process. This can have advantages in that the degree of urgency and the number of copies required are judged by professionals and included on the 'document request form' (DRF). Code 54/5 checking delivery notes, etc., occupies 1.5 per cent of all technical processes time compared with 9.9 per cent at Newcastle. All delivery notes, orders and invoices are identical at Liverpool. At site libraries, in 1974, unpacking was 43 per cent professional! This probably reflected both a staff shortage and the staff's wish to see and handle the new books! Some familiarization with new stock should take place of course. Currently this tends to be at the classification stage in that, for four site libraries, classification is not centralized being shared by Central Services Unit (CSU) staff and the site professional staff. However, code 105A shows that familiarization with new stock is 85 per cent professional. Code 56 'Accessioning' is primarily undertaken by book suppliers. It is only in the minority of cases that the CSU needs to accession items, *i.e.* where we have not ordered a title via our major suppliers.

Checking against the catalogue and BNB occupied 7 per cent of all CSU time in 1974 compared with 8.3 per cent in 1975; cataloguing reduced slightly from

		Liverpool						*Newcastle*	
Code	*Description*	*Professional % of task*	*Unit times (mins)*	*Hudson and Ford Unit times (mins)*	*COLP Unit times (mins)*	*CELRP Unit times (mins)*	*CLMRU Unit times (mins)*	*Unit times (mins)*	*% of all processes*
51	Ordering:			All ordering processes:		(for all acquisition processes):			
	Writing orders	61		6.35 (optimum manual system includes selection)		24 (for most college libraries)		2.9	
	Checking items against catalogue	32				27 (where bookamatic or triggering			
	Checking v 'on order' file			4.55 (automated)					
	Verifying all details	91				22.4 (processed by supplier)	(for all ordering processes)		
	Selection	70		9.54 (Bristol) 7.95 (Exeter)		12 (emergency rate)			
	Notification to requester of decision to purchase	18					38 Library Q		
51B	Standing order (per item)		4.4				33 Library R		
53	Post-ordering (filing, checking, etc.)		2.5						
53A	Chasing orders		3.2						
53B	Filing order forms (DRFs)		1.3						
53C	Withdrawing order forms							1.09	
53D	Book order queries	2							

54/55	Unpacking books, checking delivery notes or invoice (per item). Liverpool includes altering prices and shelving in year order in the CSU		1.7	All receipt processes: Bristol 7.54 Exeter 6.26	0.56					3	9.9
	At each site level	43	1.8	2·65 (optimum manual system for all receipt processes). 1.8 (automated)							
						A	D	E	G		
56	Accessioning		3.3	2.2	2	2.95	3	1.3	3.6	1.9	14
	Government publications									1.7	
	and queries									3.3	7
57	Packing books for site libraries (per 100 books)		2.7		0.47						
58	Unpacking accessioned books (per 100 books)				0.6						

TABLE 4: *Ordering*

		Liverpool						Newcastle	
Code	*Descrption*	*Professional % of task*	*Unit times (mins)*	*Hudson and Ford Unit times (mins)*	*COLP Unit times (mins)*	*CELRP Unit times (mins)*	*CLMRU Unit times (mins)*	*Unit times (mins)*	*% of all technical processes*
Pre-cataloguing									
61a	Checking v. BNB catalogue	13	8	All cataloguing processes: 29.47 (optimum manual)	6.6 (codes 59–61)				
61b	Allocating expenditures to budget categories. Per item		0.4						
Cataloguing				28.69 Bristol 31.05 Exeter (for whole process to filing cards in catalogue)			24 (codes 63 and 68) net 64–69 gross* (codes 63–77 + 100)		52.4 of AP2/3 21.8 of AP4/5
						A D E G			
63	Classification (including subject indexing)	62	9.2 (1975) 9.6 (1974)		5.56	5.6 6.4 3.5 5.5		26.3 (codes 63–73)	12.9 of SO2 time
63a	Queries, revision, reclassification, etc.		6.7				15 net (codes 62 and 63) 55 gross (codes 62–77+100)		

68	Cataloguing onto input forms	5.9		4·54					14·9 12.1 (AV)
					A	D	E	G	
71	Checking cataloguing		2.44	1.9	2.7	0.7	0.6	1.1	
					(includes filing)				
72	Checking classification and subject indexing	4·5							
74	Typing catalogue cards	1.1			1.2	0.48	1.8	0.7	
78	Proof reading and validation, incl. editing periodical catalogue for input. Per entry.	0.8							
	Proof reading typed catalogue cards. Per card			0.6					
	validation of print-out per entry	0.34							

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* Represents cataloguing for departmental and main or departmental library.

TABLE 5: *Cataloguing*

Code	*Description*	*Liverpool*		*COLP Unit times (mins)*	*CELRP Unit times (mins)*				*Newcastle Unit times (mins)*
		Professional % of task	*Unit times (mins)*		A	D	E	G	
100	Labels, jackets, book cards								
	at CSU	2	3.3	2	7.6	1.4	17	7	2.7
	at sites		3						
101	Triggering		1	1					
102	Dymoing spines			1.6					
103	Checking, processing and sorting	14	0.7		0.6	0.4	2.3	0.14	
104A	Creating 'quick reference' item		4.2						
104B	Creating 'short loan' item		4.5						
105A	Scrutinizing new books	85							
105–7	Checking v reservation file and informing reader		2.2						
111	Stocktaking losses recording		3						
112	Withdrawing books, removing records		3.7						3.4

TABLE 6: *Processing*

25 per cent in 1974 to about 20 per cent in 1975. This probably reflects the greater involvement of non-professional staff using 'Books in English' (formerly), BNB and CIP information to transcribe data onto the input documents for the computerized catalogue. These are checked by a professional staff member who also does the 'difficult' items. 'Keyword' indexing, classification and subject indexing are a shared responsibility of technical services and site library professional staff. Classification took some 19 per cent of the total CSU time in 1975. Newcastle indicate some 17 per cent of technical services time devoted to 'processing'. In Liverpool, where the greater part of processing is undertaken by book suppliers, the percentage is 6.6 per cent although to this should be added a currently uncertain proportion of site libraries' time. Much of the processing of Liverpool stock is undertaken by suppliers.

The unit times, however accurate or variable, are but one aspect of the problem. A further element in the data is required before one can use the information to free staff for work elsewhere—the time and quantity of work predicted for the year. Using annual report statistics is *post hoc* and hence not entirely reliable for this purpose. Past records of peaks and quantities are a guide only to future expectations. One requires an analysis of work-load and output over time in order to identify any regularities which indicate a consistently light (or perhaps one should say 'less-heavy') load in any section. Projections on an annual basis via time trends and so on may be useful for justifying staff numbers or arguing for others but this is too crude for an adequate response to seasonal or other changes over shorter cycles. What is really needed is a prediction of demands next week and next month even to the extent of morning, afternoon and evening periods. Attempts to do this are being made by sampling output during the year. The principle of relative deprivation may then have to apply—one takes from one section to bolster another that is more heavily committed. This is never easy, not least because one may be limited in one's ability to move staff between sites. Slack may not be experienced by the grade of staff required in the deprived section at that time. There are obvious limits to whom one can transfer to duties elsewhere apart from any job description or union difficulties.

Using the figures to justify additional staff necessitates the adoption of various assumptions which themselves could be challenged being in all likelihood 'improvements' on the present situation. One may have measured the time devoted to, say, shelf revision under the existing system. This may not be the ideal amount of time. One may need shelf revision twice a day as opposed to a possible current situation of once a week. One's superiors may challenge this on the grounds that you did at least survive before. There is a need to predict but one should be wary of Parkinson's law operating. Conversely staff can speed up operations under pressure, through successful staff training, or by better recruitment methods. If all that is required is the appearance of a systematic approach to work levels and staffing needs then the rough 'norms' developed (I believe) at Leicester Polytechnic may suffice. One is all aware that a Churchillian statement on one side of A4 paper may have a greater effect and be better understood than reams of possibly more objective and 'scientific' data. However, it is never easy to justify norms that appear arbitrary. These norms are:

Housekeeping:	1 clerical hour per week per 1,000 stock.
Counter duties:	2 clerical hours per hour open per week.
Mail:	5 clerical hours per week.
Supervision:	2 professional hours per staff per week.
Selection:	5 hours per professional staff per week.
Enquiries:	1 enquiry per 10 *potential* readers per week × 10 minutes.
Tuition and current awareness and liaison:	$\frac{1}{2}$ hour per 10 potential readers per week.

Weekly available hours per staff member are assessed to be 35 for this purpose. An example based on one Liverpool Polytechnic site library is shown in Appendix 1.

It can be seen that the present staff of $5\frac{1}{2}$ is nicely inflated to 8.9. Independently we have justified 3 additional staff so in this case the norms appear to work.

Conclusion

There is a need to agree basic parameters with the controlling agency. A personnel department of a local authority may not have norms for such things as 'available working time'. Indeed recent national agreements have been implemented on the understanding that no increase in staff should be demanded consequent on changes in the annual holiday allowances or the length of the working week. Similarly, library staff are assumed never to be ill! On the other hand the personnel department may wish to apply standards to all employees across the entire local authority. If it has not already done so this is a massive undertaking. The result may not be to one's liking. One may be establishing a precedent. There may be other O and M studies showing differing results. It is easier to obtain agreement to the use of such formulae if the institution, of which the library is a part, has the power to allocate staff (as obtains in some polytechnics).

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APPENDIX I

Construction Library and branch library	*'Norm'*	*Present staff*		*Potential readers (total: 1,309)*		*Present term opening hrs/wk*	*Stock*	*Prof. hrs/wk reqd*	*Clerical hrs/wk reqd*
		Prof.	*Other*	*Staff*	*Students*				
		2	3½	99	1,210	46¾+37½ = 84¼	32,000		
'Housekeeping'	1 clerical hr: wk: 1,000 stock						32×1		32
Counter	2 clerical staff: 1 hr open: wk					84¼×2			168½
Mail	5 clerical hrs: wk								5
Supervision	2 prof. hrs: 1 staff: wk		3½×2					7	
Prof. selection	5 prof. hrs: wk	2×5						10	
Enquiries	1 enquiry: 10 potential readers: week×10 mins			1×130	×10 mins			21.66	
Tuition and 'current awareness' +liaison staff	5 hrs: 10 potential readers: week			130×0.5 hrs				65	
Total hours								103.66	206.5
(÷35) = Total staff								3	5.9

Letters to the Editor

Sir,

COPYRIGHT AND SCHOLARLY PUBLISHING

It is always pleasant to find that statements one has been making for some time receive support from an unexpected quarter. The case in point is comments I have been making on the dangers of current trends towards large-scale computerized information retrieval networks,[1-3] and the unexpected support comes from Coleman's recent paper on copyright and scholarly publishing.[4]

Despite my agreement with Coleman on the dangers of large-scale networks funded by Government or multi-national conglomerates and with the need to retain the scholarly publishing scene much as it is now, I remain unconvinced that the primary cause of scholarly journals' problems is widespread photocopying, especially by BLLD. A number of studies have demonstrated that most of the use of BLLD involves the borrowing, or photocopying of 'core' journals which have widespread assured sales[5,6] rather than of peripheral journals which are at present in so much difficulty. Indeed, the suggestion[5] has been made that BLLD may well help journal sales by providing *de facto* a cheap and convenient inspection copy service.

The fact that Coleman is attacking a target—BLLD—on a point that is unjustified would not matter so much were it not for the fact that his proposed solutions are counter-productive. If Coleman's main suggestion has its way, each BLLD request would cost far more. Taking into account tight library budgets, this could lead to one of three possibilities:

1. Fewer inter-library loans would be possible, *i.e.* some users' requests would be refused, especially those towards the end of the financial year. (Who would decide which requests should be refused?)
2. Inter-library loans would be continued at the same rate, but there would be a cut in other library expenditure—including journal subscriptions!
3. As Coleman suggests, libraries could pass on their charges to users. This of course would eliminate many trivial inter-library loan requests, but also will discriminate against the less well-off user—in other words it favours Government and big business!

None of these three possibilities looks particularly palatable, and indeed from Coleman's point of view they all would be counter-productive. As someone who is concerned with retaining relatively independent and competitive control of information resources, he ought to favour an inter-library loan system which is cheap and treats all users equally and impartially. In any case, as I have suggested, he is tilting at the wrong windmill. What he should be fighting is not BLLD but our present economic system which makes cost-efficiency the overriding goal over human happiness or well-being and which therefore makes traditional labour-intensive industries such as printing and publishing so vulnerable.

DR C. OPPENHEIM
Centre for Information Science
The City University, London

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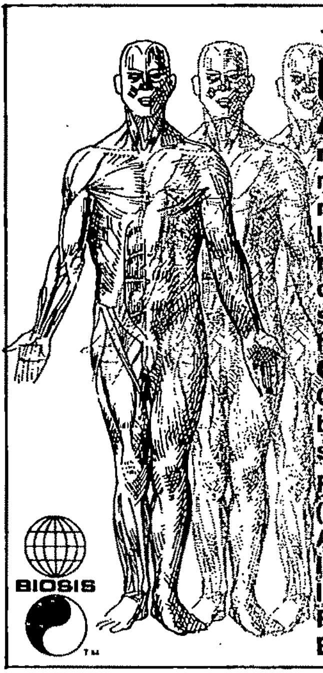

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INFORMATION RESOURCES IN THE UK: THEIR CONTRIBUTION TO A NATIONAL INFORMATION SYSTEM
SESSION 1: PUBLICLY FUNDED RESOURCES

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ERRATUM

In *Aslib Proceedings*, 29 (9), September 1977, p. 320, l. 2 of the article on 'The U.K. MEDLARS service' should read May 1966 not May 1976.

Government-funded information resources: a critique of government policy in providing and co-ordinating information

A. J. Meadows

Head of the Department of Astronomy and History of Science and Director of the Primary Communications Research Centre, University of Leicester

Paper presented at the 51st Aslib Annual Conference, University of Lancaster, 20th–23rd September 1977

Introduction

AS THE OPENING SPEAKER at this conference, I shall take the opportunity to range rather widely over the topic. In particular, I shall be looking briefly at the whole question of government involvement in a national information policy. This will allow me to link together some of the areas that will be dealt with in detail by later speakers.

Let me divide information activities in the UK into four groups:

(i) government departments and agencies (national and local),
(ii) academic,
(iii) learned and professional societies,
(iv) industry.

Government funding affects the former two more directly than the latter two. Of course, each of these groups is, itself, highly heterogeneous. Thus the information activities of a government research establishment have only a little in common with those of a local public library. There are even extensive variations in practice between different government establishments. But the important point to keep in mind is that each of these groups interacts with the others; so that the same people, under different hats, may be on both sides of the government-funded fence. For example, many of the learned and professional societies draw a number of their members, and their officers, from government service.

Funding and policy making

This leads me to the first point that should be stressed with regard to government-funded information resources—funding and policy-making cannot be equated. The prime example of this is provided by the academic world, where most of the funding comes from the government—either *via* the UGC or *via* student fees—but where government influence on information policy is both small, and liable to be resented when it occurs. Hence, we can hardly look at

Aslib Proceedings, 29 (11–12), November–December 1977, p. 384–389. Printed in Great Britain

the problem of government-funded resources in isolation: we must examine government influence on information policy, whether government funds the resources concerned, or not.

Government departments

If we look at information flow in very general terms, it is quite clear that the situation in the UK can only be properly understood in terms of its historical development. Thus, information activities in government departments have developed typically in response to demand, rather than from some deliberate planning decision. The emphasis has therefore been on the production of information—both that generated in-house and that derived from funded external sources. However, trends in recent years have tended to stress the need for an increased two-way contact, with such information being disseminated efficiently externally. In this respect, government information policy is becoming a little more like that of the academic world—emphasizing dissemination rather than reception—and less like that of industry. The point to note is that such change as has occurred in this direction has arisen more from external pressures (*e.g.* the application of the Rothschild proposals) than from deliberate planning.

One aspect of information dissemination by Government departments is worthy of especial comment, since it reflects very well the ossification that historical precedent can impose on information policy. Short of making specific enquiry, the average Member of Parliament is likely to be no more knowledgeable on what is happening in departments than a member of the general public. The tradition in this country has been *not* to keep M.P.s informed: the comparison with what happens in the United States in this respect is startling, and has very recently been emphasized by a House of Commons Select Committee.

Academic research

In information terms, the academic world can hardly be separated from the learned societies. Increasingly, the journals of the learned societies in the UK have come to represent channels for the publication of research carried out in the academic world. Now we have remarked that the academic world depends on government funding; but academic research actually has a two-fold dependence. It receives additional government backing in the shape of research grants and research studentships. These latter are interesting as they represent an area where the imposition of policy decisions from outside is not necessarily regarded as an infringement of academic freedom. There has, indeed, been some attempt by the research councils in recent years to examine possible ways of improving information dissemination concerning the research they support. On the other hand, the learned societies—the disseminators of much of this research—represent one of the most fiercely independent sectors of the information system.

In talking of research and information, we naturally tend to think primarily of science and technology. But government-funded resources extend across all fields of information: heavily in the social sciences, but just as significantly, in research terms, in the humanities. (What, for example, would all the historians do without the Public Record Office?) Certainly, the links with government are different for the humanities; but the implication of this is simply that any information policy relating to government-funded resources must be broad-based enough to cover all types of information.

Absence of a government policy

I have left aside the industrial scene as being an area where direct government funding is of lesser importance. However, it provides an excellent example of the next main point I wish to make—namely, what happens in the absence of a government policy. The Research Associations represent an important element in the efficient provision of information to industry, and are recognized as such by government. Yet they were established haphazardly—depending on the initiative of individuals or groups—and still hardly provide a coherent coverage. In fact, they can be said to underline the noticeable variations across industries in the provision of information: those industries most conscious of information needs originally have come to be more efficient in information terms today. It is an open question whether these are also the industries that most *need* information.

Information resources in the UK

We come face to face here with a basic problem of information resources in the UK—the *ad hoc* approach to planning. In any country, major developments in the information field are likely to stem from the activities of minority ('pressure') groups. The question is whether these developments are linked together into a co-ordinated whole. In some cases, such co-ordination has been introduced—*e.g.* in the establishment of an inter-library loans system. In others, the situation remains chaotic. An example here is the training of potential information users. When I take on research students, I am never sure how much training in information handling they are likely to need. It depends not just on the institution, but even on the department within the institution from which they have come. For, although much has been said and written on this question of training, no co-ordinated policy exists.

My own conclusion from these two examples is that a co-ordinated policy becomes more readily accepted when it is totally evident that individual initiatives will not do. I see this as an aspect of information policy that will tend to expand government influence in the coming years.

There is one additional consequence of the British reliance on individual initiative that deserves emphasizing. Information services in this country often lack continuity. We all know the problem of attaching a monetary value to information. As a consequence, information resources have to be very obviously necessary if they are to avoid cutback in periods of retrenchment. Successful information resources therefore tend to be carefully tailored to their target audiences. This may seem commonsense, but the result is to make such services less easy to integrate into a national network. Moreover, the growth of mission-oriented research—which implies a need for interdisciplinary information—may require a more flexible approach to information resources than individual, highly specialized services can encompass. This criterion of economic viability has not only been applied to industrial information services in the past: it has also often been required of government-funded services. It hardly seems likely that the information resources required by the UK are just those that are financially self-supporting, and no others. Certainly, overseas experience hardly bears out this supposition. In addition, the consequent insecurity and lack of career structure in parts of the information system makes it difficult to build up the necessary level of trained personnel. Without such personnel no attempt to formulate an information policy could succeed.

As against these drawbacks, the 'voluntary' approach to information policy can claim to have some advantages. Perhaps the most obvious of these relates to the learned and professional societies. Almost certainly, the independence of these bodies from government funding has emphasized their role in information dissemination (as can be seen from a comparison with other countries where governmental control plays a larger role). In the UK, the actual researchers are directly involved in the dissemination of the information that they have themselves generated: they become the final arbiters of what constitutes good research. This may be compared with the situation in France where government funding is an important element. It has recently been suggested there that funding should be withdrawn from all but the leading research journals in each field so as to improve the quality of the published research. Such an action could hardly occur in this country; and the learned societies, at least, would see this as a major advantage of our system.

It may also be argued that the 'voluntary' system fulfils the criterion put forward a century ago by Robert Lowe for education: 'If it is not cheap, it shall be efficient; if it is not efficient, it shall be cheap.' However, it is worth remembering that this comment preceded the final acceptance that education could not flourish in a *laissez-faire* system, and that government must intervene. Indeed, I see an important analogy here. The information world in the UK may now have reached a similar organizational position to that of the educational world a century ago, when the need for further progress led to centralized policy making.

Developments in the USA

Perhaps our best indication of future information trends in the UK can be found, as ever, in current developments in the USA. Both our close interaction with the USA and the similarities in our problems and institutional responses provide a worthwhile parallel. We may quote a recent survey to illustrate this:

> 'Many different individuals and institutions in the public and private sectors generate, access, and use science information. But, although science information is everyone's concern, it is presently no one's responsibility. In the United States there is no "system" of scientific and technical information. Instead, our pluralistic society has fostered a diverse collection of science information activities composed of loosely coupled units in the public and private sectors.'[1]

The first point to be noted about the US scene is the much greater intensity of thought and effort going into information problems there. The need for a *coherent* policy, sponsored, though not imposed, by central government, was already at the centre of US discussion in the mid sixties. Initially, this concentrated on government-funded STI systems, but it has gradually been extended to cover both other systems and information in the social sciences and humanities. The sweeping type of programme that has emerged from these studies can be illustrated in terms of the goals outlined in a report from the National Commission on Libraries and Information Science:

> 'To eventually provide every individual in the United States with equal opportunity of access to that part of the total information resource which will satisfy the individual's educational, working, cultural and leisure-time needs and interests, regardless of the individual's location, social or physical condition or level of intellectual achievement.'
>
> 'To make progress toward the attainment of this goal, the Commission [has] developed two major program objectives: (1) to strengthen, develop, or create where needed, human and material resources which are supportive of high quality library and information services; (2) to join together the library and information facilities in the country, through a common pattern of organization, uniform standards, and shared communications, to form a nationwide network.'[2]

So, beginning with government-funded resources, it has been found necessary in the United States to expand to a discussion of a total information policy. Yet programmes are one thing, and their implementation is another. Implementation of these schemes seems to be going rather cautiously at present, and this stems, at least in part, from the existence of significant elements in the information system that are not subject to government influence. I suspect that current pressures—to which I turn below—will lead to continued progress, but it may well be slow. The US, in any case, can provide a model for us: what we certainly should do, and have not yet done, is to examine *systematically* the US studies relating to a national information policy, to see whether there may be parallels for us.

Need for government involvement in information

What then are the pressures that currently point to more government involvement in information, and to a corresponding need for a better formulated information policy? Some are obvious. Increasing use of technology (especially of computers) can hardly fail to involve central government in view of the funding required. Similarly, growth of transmission facilities, such as networking, necessarily brings in the national communication system. It is very difficult to see how this trend can be reversed. No doubt the electronic journal is a long-term aim; but everyone accepts now that computer handling of information will become increasingly competitive with more traditional modes as time passes.

Some of the pressures are slightly less obvious—*e.g.*, the growth in the amount of information in circulation. Recent studies both in Europe and in the USA predict not only a continuing increase, but also an increasing diversity of forms. Again, this implies an increased cost of handling that may, once more, lead to government involvement. Finally, the UK clearly cannot remain isolated from world trends. But international co-operation and, more especially, standardization will be difficult to achieve without intergovernmental intervention.

A national policy

If, then, the logic of the situation demands that there should be more government involvement in a more clearly articulated information policy, we are faced with a series of questions. What should the policy cover? When should it be established? How should it be implemented? I take these to be matters for debate at the present conference; but would throw the following points into the discussion. Some suggestions with regard to coverage occur in recent UNESCO statements on the need for development of national information systems (NATIS). We might paraphrase some of these suggestions to provide the following five categories for inclusion in a national policy:

(i) The training of potential users.
(ii) The training of potential transmitters (*e.g.* librarians, journal editors).
(iii) Access to, and from, existing services.
(iv) Internal operation of existing services.
(v) Creation of new services.

There is at present no central body that fully covers all these aspects of information policy (though British Library is, of course, widely involved). A policy-making body would need to include representatives of all the main sectors of the information system—according to my division at the start, these would be governmental, academic, professional and industrial. It would also need to be more than an advisory committee: which implies both official recognition and access to an independent budget. Bodies of this general sort do exist in the UK—the Schools Council provides an example in the field of education—so one would not be setting up an entirely new type of system.

Conclusion

Whether a central body could be established, however, depends in the first place on the existence of a general willingness to co-operate in formulating a national information policy. The current financial problems that afflict virtually all our information systems might well provide the motivation for co-operation. However, the same financial problems also affect the government-funding agencies. This leads to the final question we should ask—can we demonstrate that the establishment of a national information policy will lead to a more efficient usage of resources? If so, there is an excellent case for proposing that the government should back a new initiative in the field of information policy. In view of the various pressures currently at work such an initiative might well be timely now.

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Overseas resources funded by government: a world system in the making?

P. J. Judge

Head of Central Information, Library and Editorial Section, CSIRO, Canberra, ACT

Paper presented at the 51st Aslib Annual Conference, University of Lancaster, 20th–23rd September 1977

Government funding

IT WOULD HAVE BEEN both tidy and convincing to have started this paper with statistical tables showing what resources are funded by governments overseas. If I have not done so, it is both because the figures are not readily available, and the task—taking 'overseas' at face value—like the universe, is unbounded. Indeed, as defined for the statistics which show we are entering a post-industrial Information Society, 'information' may cover *any* activities concerned with the processing of symbols rather than of materials. Even if we restrict the term to the provision of specific services by word of mouth, document or computer output, it is still difficult to draw tight boundaries. The OECD struggled unsuccessfully for ten years to reach international agreement on meaningful and useful definitions for statistics on information; hopefully the recent US compilation of *Statistical Indicators of Scientific and Technical Communication*[1], will stimulate further efforts in other countries. There is an enormous and urgent job to be done.

However, it is fair to say that in the 130 or so nations which collectively constitute 'overseas' (except in the USA), most services are funded by governments. Such funding can be at national, or state or local level: in Australia, *e.g.* the National Library, CSIRO and the government departments are mainly federally funded. The six states fund their state libraries and public library services, with some local government support, and also provide the agricultural extension services. The Universities and other tertiary education institutions are funded by the states with federal support.

This is a familiar pattern in any federal country—Germany is very similar. Because of the different accounting systems it is difficult to pin down just what each level of government may be providing in the way of information services. Regrettably, this may limit also the amount and kind of co-operation that is possible between these services. Local governments have a traditional mistrust of the central authority, and have preferred to go it alone wherever possible rather than lose their independence of action. However, the economies of scale offered by computer networking are beginning to break down this mistrust.

I have said that outside of the USA most information services are wholly or

Aslib Proceedings, 29 (11–12), November–December 1977, p. 390–397. Printed in Great Britain

partially government funded, but even in the USA there is a great deal of public money involved. Williams and Brandhorst[2] in their report on Computer-Readable Bibliographic Data Bases, state that 41 per cent of the 160 US data bases are produced by the government sector, 31 per cent by the 'for-profit' sector and 28 per cent by the 'not-for-profit' groups. These figures may not adequately reflect how the services became established. During the heroic days of the 1960s, when the foundations of all the big data bases were being laid, it is likely that NSF money (then much more liberal than nowadays) was a vital resource for almost all the developments that have been so important. This includes some of the biggest systems in the non-government sector. US Government support helped launch the Science Citation Index, and contracts from the National Institutes of Health assisted Excerpta Medica in its computerization programme.

The services which provide access to these data bases outside the USA are also mainly the responsibility of governments, although obviously Lockheed, SDC and other commercial on-line developments are becoming of major importance wherever they can be economically interrogated directly. For example, ISI is currently available in eleven countries and BIOSIS in nine, in all but the USA through largely government-funded agencies; INSPEC is available in seventeen countries, in all but two or three of them through government-funded agencies. The Chemical Abstracts Service[3] classified only 16 per cent of its subscribers as 'government', but this is a strongly industry-used data base.

The world-wide penetration of these data bases is greater than these numbers of countries suggest, often due to government-supported activities such as the Scandinavian network or the European Space Agency net.

The Australian situation

The Australian situation may serve as a case study of trends in government funding—a stationary trend in money terms at the moment, although the information services are developing strongly none the less.

Australian science and industry are relatively well served with data bases,[4] mainly of US or other overseas origin, but with the Australian material well represented in these files. Certainly, searches on Australian topics in any of the major files are usually rewarding. This in part due to the fact that Australian scientists, who are responsible for about 2 per cent of the world's R & D, publish more than half of this in overseas journals. In part it is also due to the fact that CSIRO indexes about 400 Australian science journals in *Australian Science Index* and arranges for papers published in the major journals to be drawn to the attention of the data base producers overseas. The National Library has a similar publication covering the Social Sciences and Humanities: the *Australian Public Affairs Information Service*.

Information activities in Australia have developed from library reference work, and there is still a corpus of the library community that questions what 'Information Science' is, and what information scientists do, that is different from librarianship. A recently formed Information Science Section of the Library Association of Australia is attempting to answer these questions and promote the opportunities for professional training and advancement in the information field.[5]

The largest providers of information services are the National Library of Australia (NLA), and the Commonwealth Scientific and Industrial Research Organization (CSIRO). The NLA, even before the restructuring of its science branch as the Australian Scientific and Technological Library (ANSTEL) in 1975, has been concerned to develop services that can more fully exploit its collections. CSIRO, whose network of more than forty libraries constitutes one of the largest collections of scientific literature in the world, has been offering a variety of information services since it was established in 1926. A big organization—more than 6,000 staff—all its scientists accept responsibility for answering questions from the public (150,000 of them last year). The Central Information Service plays a major part here in co-ordinating referral activities, besides publishing indexes and directories and operating the computer services.

Publicly available services from the main agencies, all but the last two* governmental, can be summarized as follows:

		SDI	RETRO
National Library of Australia (NLA)	MEDLARS	×	×
	BIOSIS PREVIEWS	×	(via Lockheed
	SCI	×	(via Lockheed)
	SSCI	×	(via Lockheed)
	ERIC	×	(via Lockheed)
Commonwealth Scientific and Industrial Research Organization (CSIRO)	CHEMCOM	×	(via Lockheed and SDC)
	BIOSIS PREVIEWS	×	(via Lockheed and SDC)
	INSPEC	×	(via Lockheed and SDC)
	AGRICOLA	×	(via Lockheed and SDC)
	FSTA	×	(via Lockheed and SDC)
	SWRA	×	×
	CSIRO Index	×	×
	Australian Science Index	×	×
	Solar Energy	×	×
	Earth Sciences	×	×
Department of Productivity	NTIS	×	
	COMPENDEX	×	
Australian Atomic Energy Commission (AAEC)	INIS	×	×
Australian Road Research Board	IRRD	×	×
* Australian Mineral Foundation (in collaboration with CSIRO)	Australian Earth Sciences	×	×
* Australian Paper Manufacturers	PAPERCHEM	×	×

Both NLA and CSIRO provide access to all Lockheed data bases, the NLA by dial-up from its terminal in Canberra, CSIRO through its operator in the Australian Embassy in the USA until this post was axed in one of the Government's economy drives, and since then through a Washington computer bureau.

Plans recently announced by the Overseas Telecommunications Corporation (OTC) will give a trans-Pacific link to the US data base at a greatly reduced cost: around \$5 a search instead of the \$25–40 now current. This is expected to have a great impact on the use of these services—*e.g.* CSIRO's Australia-wide computer network has over 300 interactive terminals which are all expected to have access to this link by the middle of next year.

Meanwhile, besides the SDI services, the NLA is operating MEDLINE through terminals in nine University libraries, and has just launched AUSINET, based on a commercial network (The Australian Consolidated Industries Computing Services). This latter network offers two- or four-hour access a day, for subscriptions of about $1,500 or $3,000 per month, to a variety of files rotated throughout the week, including those the NLA offers as SDI, together with sections of the Chemical Abstracts, INSPEC, COMPENDEX and NTIS files from CSIRO and the Department of Productivity.

The impression is of great activity, and the probability through the OTC link of overcoming the 'tyranny of distance' in some respects. Not entirely, of course: journals received by surface mail still take about three to five months to reach our library shelves. The assiduous reader of airmail editions of *Current Contents* is often frustrated at a three-months or more interval between requesting a paper and receiving it. Indeed, many now write straight to the author requesting a reprint, rather than wait.

Moreover, a steady squeeze on Australian government spending and staff ceilings is limiting what can be attempted in the way of new services: even if real costs can be recovered from the user, the restriction on hiring additional staff is at present absolute. This is the potential drawback in any situation which relies heavily on government support: a shift of policy or a recession may lead to withdrawal of that support.

This audience will not need reminding of the ending of the Industrial Liaison Officer scheme in the UK nor of the sudden demise of the US State Technical Services just as they seemed to be attracting favourable attention. And yet, in a situation where opportunities abound and resources are increasingly limited, we should probably expect more of this deliberate cutting back in one area to encourage growth in another.

In Australia, there have been moves for some time to identify a stronger policy to attract greater support for national action. A report commissioned by the NLA five years ago, the STI Services Enquiry Committee (STISEC) Report[6] has been the major debating point, but is only one of twenty-seven relevant reports identified by Allan Horton in a recent address to the Biennial Conference of the Library Association of Australia. Indeed, Horton comments 'there is no lack of information policy in Australia—just an overabundance of policies which are neither comprehensive nor co-ordinated'.[7]

Professional bodies like the Library Association of Australia and the Australian Advisory Council on Bibliographical Services (AACOBS, a body established some years ago to facilitate discussion between national and state representatives) are submitting their views on these national issues. But a large country with a small population (only 14 million) has a limited tax base to carry the schemes that are coming forward, and the message is strongly that we must cut our coats according to the national cloth.

Horton, quoted above, was responsible for a major report on public libraries in Australia,[8] which included in its recommendations proposals for a $20 million increase* in federal support for public libraries across the country and the establishment of a National Planning and Policy Body—the latter figuring also in the earlier STISEC report. Commissioned by the Labour Government, Horton's report was submitted after the 1975 election had radically changed treasury policies on support for such activities. The report is still under examination by an interdepartmental committee, which is also reviewing the NLA proposals for an Australian Library-Based Information Service (ALBIS) and the proposal for a National Information Office in the election policy statement of the in-coming government. But there is pessimism in library circles about the possibility of a favourable outcome to this examination, given the present financial straits.

Overall, Australia is probably doing rather well in the provision of information services of all kinds. In spite of the criticisms that many people voice at the present lack of a clearly stated single policy, there is a sense of moving forward and solid co-operation at the operational level. But there are major problems which result from the failure of library budgets to keep pace with inflation: journal cancellations, inability to maintain monograph collections, and growing anxiety about the future of inter-library lending, given rising postal charges and diminishing staff ceilings. Is this so different elsewhere?

Towards a world system?

Thanks to UNESCO, there is already a remarkable commonality of approach by the world's governments to the provision of information services. This has not yet resulted in a 'world system', but agreement on objectives is already a fair beginning. Also, AGRIS has offered a means by which even the smallest developing country can begin to contribute what it has to the common weal, receiving not only the whole of AGRINDEX in return but the support of FAO in obtaining documents on microfiche.

However, the chance to spend most of July last year in Ghana brought home to me the enormous problems that many developing countries must face in beginning to make use of the information opportunities that exist for them worldwide. (After all, several industrial firms in Australia regularly interrogate the Lockheed files by dial-up across the Pacific, finding this quick, effective and relatively cheap. Why cannot all other countries do the same kind of thing?) We find it difficult to imagine a situation where telephone communication even within a city may be so uncertain that it may take days to make a call. Where practically no library has an unbroken run of its journals. Where there is no national union list of journal (or monograph) holdings. Where inter-library lending is virtually ruled out because the books are too precious to let out of the librarian's sight. Where photocopies are almost unobtainable because, although there are modern photocopying machines, there is no paper this month because of the shortage of foreign currency to import it. And so on.

In Ghana, most educated people speak excellent English, but in many countries there is a serious language problem. The upsurge of nationalism in one developing country I visited recently has meant that the language of instruction in the universities has now changed from English to the national language. Two immediate results have followed. First, the enormous intellectual effort absorbed in translating undergraduate texts into the national language, giving, incidentally, a disturbingly limited choice of reading matter to the students. And, secondly, the effort to learn English at post-graduate level, with the waste of time and inefficiency this entails.

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* Per annum, over 10 years.

I am aware that cultural heritage is sacred, but given the other difficulties under which these countries labour it seems an unnecessary complication on the road to economic and social development to set the added obstacle of a minority language in the way of local scholarship. There seems also to be psychological blocks to the use of advanced information services by the scientists in developing countries, even where special efforts are made to encourage their use. CSIRO has offered access to its computerized information services to a number of South-east Asian countries, through a body called the Association for Science Co-operation in Asia, and through personal visits by myself and some of my colleagues. In two years we have had only one request for these services. This lack of response has a worrying implication: having obtained a small government grant to cover the costs of providing these services, how do we explain that they are not being used, in spite of the best we can do to encourage the potential users? And if demand develops later, can we persuade the government to renew that small grant?

That this demand will develop seems a foregone conclusion. Tony Cawkell[9] has recently discussed why growth of use of on-line services outside the USA will be slower than the starry-eyed prophets had originally predicted, but nevertheless growth: say 10–20 per cent per annum instead of 100 per cent. Mats Lindquist,[10] using a growth dynamics model similar to that used in the 'Limits to Growth' study, has demonstrated how the levelling out of demand after the initial honeymoon phase of a new service may seem like 'stagnation' but is still part of a growth curve. A good service attracts clients, is saturated, then expands. The era of the $5 computer search is with us already and the $50 manual search is no longer efficient wherever we have access to on-line data bases.

Another factor limiting use may, however, be the lack of training of both potential users and intermediaries. Carole Wilmot,[11] comparing on-line operation in the USA and UK has noted that even in the USA most searches of on-line data bases are performed by intermediaries. The reasons she gives are:

—intermediaries reduce queueing time at the computer terminals,
—the users are not trained, and there is insufficient library staff able to train them,
—the search is more effective if done by someone familiar with the data base—there is a need not only for knowledge of how the computer works, but of the content and structure of the data base,
—there is a need for the use of correct indexing terms,
—there are different commands and search strategies for the different data bases,
—the end user may be unwilling, for a variety of reasons, to do the search himself.

There is a shortage, even in developed countries, of those who have both the competence and the time to train these intermediaries. CSIRO has some experience in assisting the Korean Scientific and Technical Information Centre (KORSTIC) to set up a chemical abstracts search service, using CSIRO software on their identical Cyber 76 computer configuration. This required six weeks' training in Melbourne for four Korean specialists, plus about ten days spent by a CSIRO systems analyst in Seoul for commissioning the service. Adding INSPEC to this service, now that it is well run-in, it is still expected to take one of our experts about another ten days in Seoul next month.

The NLA is offering training in Canberra for those providing MEDLINE and AUSINET services, and will also train operators for any institution that wants to dial Lockheed in California—a training that will stand in good stead once the OTC trans-Pacific link opens. But looking more widely, one cannot foresee a dramatic surge in demand from the Third World for computer services: established habits of obtaining information, training bottlenecks, cost, document access, communication difficulties, all raise problems that will have to be solved as we go along.

How serious is this? Quite possibly, not at all. The scientists to whom I have spoken in Africa and South-east Asia do not feel themselves limited by shortage of information. Many of the senior research staff have studied overseas and are in contact by correspondence and reprints with colleagues in the developed countries. But, they tell me that when they write away to new contacts asking for reprints, on average only one in three requests is successful—there seems to be more effort that we should all be making here, to take these requests more seriously. Fortunately, international bodies, especially UN agencies, are increasingly helpful. So it appears that the information situation, even in developing countries, is by no means in crisis.

● The important thing seems to be to go ahead and do something, *with* the users, and not just *for* them. A little pragmatic progress may be worth a great deal of 'policy' without corresponding action. The pattern we begin to see emerging in Australia, where the scientist may have three or four paths to a particular piece of information, may provide a helpful stimulus to efficient provision and efficient use. Meanwhile, we can begin to move towards a more rational use of all our information resources at the national, regional and world levels.

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The local authority input

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Paper presented at the 51st Aslib Annual Conference, University of Lancaster, 20th–23rd September 1977

MY CONTRIBUTION TO this conference will be an attempt to outline the part which local government—and that means principally, the public library—can play in a national information plan. This implies a need to look at the effectiveness of such services, their relationship with others, and indications for the future, bearing in mind the economic climate which is likely to prevail for several years yet.

Clearly, my brief does not call for a catalogue of the achievements of locally-funded information services—under this heading we must also include advisory services—but I do not think I can begin without giving you a brief reminder of the traditional role of the public library in Great Britain as an information provider.

The public library in Great Britain

Right from the start in 1850, the rate-supported library has been (as some of the early opponents had feared) a disseminator of knowledge and an agency for self-improvement. This function has remained, right through its 120-odd years of existence alongside the companion roles of establishing and maintaining a working literacy and providing a base for the intelligent use of leisure, though it is the latter in the shape of home reading facilities which so many people still regard as the sum total of public library services.

It was inevitable, especially in the light of limited financial resources over the years, that there should be a substantial short-fall from the precept of 'all things to all men', which seemed to be the comprehensive objective of the early municipal libraries. If the public library has been unable to keep pace with the implications of that maxim and the needs of a society, which has steadily become more complex and sophisticated, it is, perhaps, hardly surprising.

Seen against that light, the large cities which have long accepted the responsibility of being information providers to the business community, as well as the general public, have a remarkably good record, especially where local schemes of co-operation have relied heavily on the resources of the central library.

That is not to ignore the roles of the industrial and commercial concerns—firms and associations which, since before the war, have sought to be largely self-sufficient (if that is remotely possible for any organization in these days?)—but a large portion of the economy of the country is in the hands of small

Aslib Proceedings, **29** (11–12), November–December 1977, p. 398–410. Printed in Great Britain

businesses and it is these which must look to public sources near to home. This is especially true of the firms which not only are too small to permit much in the way of self-provision but are often located away from large centres of population.

Information services in Wales

In 1970 The Library Council for Wales appointed a working party to consider how best public libraries could meet the library and information needs of industrial and commercial firms in Wales, including service industries, wholesale and retail companies, financial, professional and consultancy partnerships, transport and communication companies, government agencies, individual farmers, tradesmen, and small shopkeepers.

The working party suspended operations for a time following the publication in 1972 of the report of the Bolton Committee and the subsequent establishment by the Department of Industry of a number of Small Firms Information Centres.

The Council has now published its report *Library and Information Services to Industry in Wales*[1] and it is interesting to note that they consider that the contribution of the public library was in no way less valuable as a result of the setting up of the centres, rather that 'the case for developing a reliable and well-organized information system was greatly strengthened by the existence of a sign-posting service able to pass on to it relevant enquiries'.

However, the report goes on to say 'the efficient provision of an information service to commerce and industry calls for a degree of specialist knowledge and expertise beyond that of most local librarians'.

With this in mind, a two-tier service is recommended with, first, a local service provided by public libraries, which will be able to answer a wide range of enquiries from resources immediately available and, secondly, a central point to which more difficult enquiries can be referred. The Council is convinced that the best equipped and most appropriate institution for this purpose would be the National Library of Wales.

Counselling service

In the last twelve months, as an extension to the Small Firms Information Centres, a pilot 'counselling' service has been established in the South West, with 'clinics' set up at various places, including Exeter and Plymouth. In the former town, I am glad to say that a room in the Central Library is used by the 'counsellors' for their 'consultations'. This is, of course, a prime example of the need for 'information' to be extended further into advice (something that we shall come across again later) but I quote it as an example of close co-operation between central and local government departments. As the service settles down we see a distinct advantage in the close proximity of the resources of the Exeter Central Library—not only for the counsellors, but also their clients.

Local government reorganization

In the large urban areas it has always been comparatively economical to provide the primary services to which the report from Wales refers—certainly, in relation to most of the remaining authorities which, until 1974, were either too small or too scattered, with rare and well-known exceptions, to contemplate such provision. Local government reorganization in the shape of larger authorities has now given us the opportunity in many of these other areas (of the thirty-nine new English counties, thirty have a population in excess of half a million) to begin to tackle seriously these problems. Opportunity in the shape of consolidated and rationalized stocks of printed resources—though we must not forget the 'cuts' which have affected everyone to a greater or lesser degree—opportunity in the shape of greater flexibility that naturally follows the merging of a number of formerly separate authorities—but above all in the bringing together of town and country which was what reorganization was supposed to be about anyway. My own authority is, perhaps, a typical example where the former county boroughs of Plymouth, Torbay, and Exeter have merged with the old largely rural county and two much smaller authorities to become one unit serving nearly a million people.

In the South West, where there used to be over fifty separate public library units in the Regional System there are now only ten. We, that is the ten Chief Officers, can and do collaborate much more easily. Any such move away from the old isolationism of some of the former authorities must surely be for the good. So I see local government reorganization as a firm step towards the national network that this conference is all about.

It seems reasonable to suppose that any future reformation of the boundaries of local government to produce yet larger units—one has in mind here regional authorities—or even the ultimate of nationalization—would automatically simplify the organizational problems of a NATIS structure, though others would inevitably emerge. However logical this may appear (and I would not be rash enough to advocate it at this juncture) it is, of course, very unlikely to happen—so far as the public library service is concerned anyway. Indeed, the recent Labour Party discussion document indicates the opposite—that libraries should become the responsibility of suitably enlarged district councils. There appears to be a partial concession of the assumption, however, in the revival of Lionel McColvin's 1942 proposal of regional reference libraries.

Most public librarians would claim that, in the United Kingdom, we have the most comprehensive pattern of provision in the world. If this is remotely true, in spite of a certain degree of parochialism in the past, and the severely limited financial input for what has always been regarded as the Cinderella of local government (many public libraries' services even in these days of inflation still cost in total little more than 15p per week per user), tribute must be paid to the efforts of those who laid down the foundations of the inter-lending network nearly fifty years ago and developed the subsequent schemes since the last war.

The British Library

In contemplating any plan for the future on a national and international scale, we must be prepared to seek to maximize the better features of the present systems. The past five years have seen not only the reorganization of local government but also the establishment, in 1973, of the British Library. Peter

Stephen, of the Manchester Library School, in a recent article quotes it as 'the most significant development of all, in terms of the NATIS concept in the UK.'[2]

Stephen goes on to remind us that the policy of the British Library Board is to ensure that the library plays its part in helping to foster the development of a closely articulated national system of library and information services.

Though so much has already been achieved since its formation, as with local government reorganization, four years is all too short a time to see more than early indications. However, public librarians are bound to view with suspicion some recent proposals, appearing as they do, to ignore the value of schemes that have been painstakingly built up over the years.

One or two factors will undoubtedly affect the operation of inter-lending services in the future. The high cost of postage is forcing us to look at other means of transferring bulkier materials from one point to another. Perhaps we are entitled to expect that serious consideration might be given to a cheap book post, as some other countries have. This apart, research has already been carried out by the British Library into the use of transport in an attempt to meet the situation. In the South West, the ten county libraries are also now operating a limited scheme, using their own vans, meeting at key points. This is bound to be relatively clumsy and slower, in most cases, than the Post Office service, but it does not preclude using faster methods for urgent requests. But, costs cannot be ignored and my own authority for example this year expects to show a saving of £6,000 by this means.

The widespread use of photocopies can, of course, do more than anything else to alleviate this problem, though the findings of the Whitford Committee are not without significance.

In a paper given at a weekend school in this University last year, Russell Bowden, now Deputy Secretary of the Library Association, stated that:

> 'Unesco's work in the library and information field is usually considered to be more relevant to the needs of developing countries than to those of the industrialized world. In relation to these two concepts, however, Britain is still a developing country.'[3]

If my interpretation of his latter remark is correct, in that this would require a NATIS programme to start virtually from scratch, then I cannot agree. We already have the vehicle even though one or two components are somewhat rusty or, having done a fair mileage are overdue for servicing. It is surely a question of a complete overhaul rather than buying a new model.

A corporate approach to planning

The need for genuine co-operation which has always been evident, is now vitally so. Since reorganization in 1974, the emphasis in local government has been on the corporate approach—we have the corporate team and corporate planning. The succeeding economic crisis (which incidentally is the real culprit for most of the wrongs that are attributed, chiefly by the popular press, to reorganization itself) now demands that same corporate approach towards full, real and meaningful co-operation between government, local authority, higher educational (that is the universities and polytechnics) and industrial and commercial agencies, if the true concept of NATIS is to be more than a dream.

Peter Stephen maintains in countries like the UK the NATIS concept faces a whole range of problems, not the least being the intransigence of vested interests. I am not sure that I know precisely what he means by the last part of that statement, but an element of his thinking surely lies in the inherent capacity for librarians to be natural empire builders. It probably has something to do with the need to acquire and accumulate in the process of developing a library, though in the case of public librarians, it also may not be unrelated to the circumstances which usually prescribe that they should be away from the centre of things in county and town halls.

Old traditions die hard but the hope must be that the new generation of librarians and information officers with their wider, not to say higher, educational background, may see these problems more objectively, and press for less prejudiced solutions. In public libraries, we have now largely eliminated the old municipal versus county rivalry and one also detects a freer movement between the local authority sector and others.

Educating users

The inculcation of the reading habit in children, from the earliest possible age, has long been a primary objective in a great many public library systems. I believe that to promote the development of basic literacy in our youngest citizens is one of our most important functions.

It seems, however, that at the same time we have largely neglected the equally important role of training many of those young people when they reach a more mature stage in their education, in the rudiments of seeking the basic information they require for their studies. How many young people leave their sixth forms (or wherever it is they do their post 'O' level work these days), perhaps with a very high standard of academic achievement, for places on university or polytechnic courses, but with little more than the haziest notion, once they have left the protective shell of the school, of obtaining the material they will need for their undergraduate studies?

If we go further, to when a good proportion of those same people find themselves trying to hold down a job in industry or commerce or a profession, it is very likely that many will find themselves leading such busy lives as to have little time to pursue that reading habit which they acquired so many years before. Instead, it is equally probable that they will have need of information, often such simple facts as may be found in (to us as librarians and information officers) the most obvious reference books—information that may have an important effect on the success not only of themselves as individuals, but of the concerns which employ them. No one can doubt that these worthy citizens—and they form a considerable segment of our society—are other than book-wise—but in a narrower, more purposeful sense, they can only be termed 'information illiterates'.

This deficiency in their education can hardly be blamed on the kind of individual I am referring to, but on the contrary, must be attributed to us in the profession. Perhaps we can plead that we have insufficient credibility in the eyes of the general public but certainly, if the concept of NATIS is to gain wide acceptance, we clearly are entitled to expect that our contribution to the nation (valuable as we regard it) is taken much more seriously.

User awareness is therefore a vital consideration in any move towards a more integrated pattern of information provision. Perhaps it is a fundamental requirement that a co-ordinated plan be worked out as part of a national policy to provide the necessary education and training at all levels, from the 'general', even the 'popular', to the highly specialized needs of research workers. Would it be so very difficult to convince the education world that this is a highly desirable project?

Librarians, however well organized professionally, are not blessed with sovereign powers and the vast majority are responsible to a committee or a more senior executive in the establishment. Public libraries are, by their very nature as local institutions, subject to the immediate control of their individual authorities which, without contravening the spirit of the legislation, do not always find it convenient to abide by the law of the Medes and Persians! Nevertheless, though the 1964 Act did not prove to be the aperient that the patient needed, it at least gave authority for government intervention in the jurisdiction of public libraries in the shape of the Arts and Libraries branch of the DES, and the associated Library Advisory Councils.

Since any NATIS programme will surely require sanction at the highest level, the nationally appointed members of Council will presumably figure prominently in the planning, though they would, of course, require a much wider brief than the present one which is public library orientated. The very small band of 'civil servants' would also need to be strengthened to cope with an enlarged mandate.

Public library services

I mentioned earlier the Small Firms Information Service and its experimental extension into counselling. These are but recent examples of the proliferation of information and advice services in the seventies. How do these relate to the type of service which the public library has traditionally offered to the man in the street and how can they be assimilated into a national plan?

There are a number of factors involved, not least the passive role that we (and I am referring still to the public library sector) appear to take? How many people still have, as their image of a librarian, the nineteenth century introvert who sought the library as a quiet backwater where he could escape the hustle and bustle of the hard world outside? It was probably never true—but impressions, even false ones, die hard. Ask any careers officer how they see librarianship and I think we would get a little of that reaction.

Perhaps there is some justification for this impression in that public librarians have often appeared to work on the assumption that we cannot be expected to answer the customer's question for him, rather that we should need only to point the way, leaving him to find the solution for himself. 'Help people to help themselves' is perhaps as far as we can have been expected to go when we would plead that, to give a more effective service we would need much better staff coverage at the right level. Certainly if we are to convince the would-be user that we are exploiters of knowledge and not merely custodians, we must take a much more positive attitude. Again, Russell Bowden states that librarians, the professionals concerned most with information dissemination and the transfer of knowledge, with few exceptions, are doing nothing in an area that is central to the existence of traditional British democratic society.

What are the requirements of the citizen in this bewildering world? Obviously they vary according to his social standing, his education and his ability to interpret the endless mass of regulations and conditions that a highly developed society seems unable to do without. Many of these not only require an intelligent understanding but demand participation, involvement and a response if democracy is to be seen to work.

Structure plans

At the present time county planning officers are busy preparing their 'Structure Plans'—some must be ready for presentation to the Minister next year. This highly involved exercise is primarily for the professionals, and secondly the elected representatives, but as the future well-being of every citizen in the respective areas is closely concerned, then there must be a proper and meaningful feedback from ratepayers who are footing the bill. Displays, associated with public meetings, are an excellent way of informing the public of such important matters and the public library can act as an official 'mouthpiece' in that, in many places, it is the most obvious, sometimes the only possible, venue for the staging of such exhibitions.

Here maybe lies some possible difficulty in the appearance of the public library in such a role. Alex Wilson, Director of Libraries and Museums in Cheshire, who is a long-standing authority in the field of local information services sees just such a snag. In an address to the Scottish Library Association Conference last year he considered the public library's role as an information/advice centre in these terms—'represents authority and therefore unacceptable to some and unavailable to others'.[4]

Public libraries and the citizen

Following the Trades Description Act of 1968, consumer advice centres have been established by local authorities in various parts of the country. Perhaps the key lies in their presence, not in the central offices of the Trading Standards Department which is responsible for the service, but in the High Street, where their link with officialdom is not so apparent. Perhaps, an even better example can be seen in the 'Job Centres' which are now a colourful feature of most shopping centres. A far cry indeed from the labour exchanges of the inter-war years. What is good for the government is surely not bad for us. I am strongly of the opinion that we should give serious consideration to a down-town presence for the public library information centre. One or two of the more enlightened authorities already do this. The danger is that where they become 'civic' information bureaux, the appellation again might have a slight taint about it.

It might be considered that such centres would be liable to duplicate some of the work of the Citizens' Advice Bureau, established just before the war, primarily with the needs of war-time conditions in mind, and indeed during those six years, often housed in the local library with the librarian as organizer.

After a period in the doldrums during the 1950s, the movement picked up again, largely due to a resumption of government financial aid to the central office and in the past three years with a further 'development' grant to the national association, has become even more firmly established.

In my part of the world where the full-time organizer is responsible for the two counties of Devon and Cornwall, good relations have now been established and in one town at least (Teignmouth) the Bureau is housed in the local library. A training session in the central library is also a feature of the new volunteer's induction course. It is, however, interesting to see how the movement has developed without having to rely heavily on normal printed sources. Instead, a highly organized 'package' which is regularly up-dated forms the basis of the service. There is a lesson here, perhaps, for public libraries and indeed Alex Wilson has taken up the idea by providing his civic information centres and libraries with the Cheshire Information Service package which is specially designed to incorporate items of local significance.

Other agencies for advice and information such as those covering housing, legal aid, money, and neighbourhood affairs have sprung up throughout the country in the past few years, mainly in areas of social deprivation with the 'disadvantaged' very much in mind. These are all well covered in the *Fourth Right of Citizenship—a review of local advice services*[5] recently published as a discussion paper by the National Consumer Council at the request of the government. Although the authors conclude that 'central government funding departments must get together and work out a common policy' and that 'lack of close collaboration between all the agencies involved is wasteful and confusing for the public', librarians will be somewhat dismayed, though perhaps not surprised, that nowhere is there any mention of the contribution which libraries can make.

However, they would gladly support the exhortation to government departments. Whilst the DES has by far the major responsibility there is need for liaison at a high level with the Department of the Environment and the Department of Industry.

Comparison with the USA

Just over two years ago, in a research project sponsored by the British Library, E. D. Walley of the Department of Librarianship at Leeds Polytechnic crossed the Atlantic to study at first hand the developments in community information services in public libraries in the United States, where some pioneer work has been done in this field, though there are a few libraries in this country (Lambeth especially) where this type of 'outreach' service has been going on. Walley published a report jointly with the head of his school, Donald Davinson, in October 1975.[6]

Research officer for community information services

The significance of these investigations and of other work sponsored by the Research and Development department of the British Library, can now be seen in the very recent appointment for three years of a Research Officer for Community Information Services to be based at the Library Association but funded by a grant from the British Library.

This is indeed a most encouraging sign based as it is on a report of the government 'think-tank' in 1975—*A joint framework for social policies—a Report by the Central Policy Review Staff* which states—'There is a real need for a more co-ordinated approach towards advice and information services, which are a vital point of contact between the social services and the citizen'.

It may be argued that all this activity is taking place beyond the fringe of what librarians and information officers regard as their legitimate territory. Undoubtedly the new research officer mentioned above, once she is able to get out amongst the community groups concerned will obviously discover that such printed material as is involved is largely what the cataloguer would describe as ephemera and fugitive! Does this then let the librarian off the hook? Can we justify confining ourselves only to conventional sources?

The answer must surely lie in attempting to serve the whole needs of the community—society at both work and play. This may well call for a radical re-appraisal of public library services. Lending books is but one aspect. Bowden states 'If librarians become, as a profession, involved, then they have a central and significant role to play in our community and in national life.'

Clearly, we cannot expect any return to a growth situation in the foreseeable future so that any early achievements must be at the expense of some of our existing commitments. With the application of a few basic principles of productivity, it should surely be possible to make an all-round improvement in our standards of service.

Whilst this may sound like heresy to some ears, we may need to think twice about the acquisition of the more specialist and expensive material, which may well have only the most occasional use. If the British Library Lending Division is going to be able to meet an increasing demand for such items, perhaps the public library sector can divert the money saved on more of the right staff. My own authority has recently approved just such a proposal to improve the service to business and commerce.

On-line systems in public libraries

The scope of on-line information retrieval and its role in the overall NATIS programme will be amply covered by other speakers. The inclusion of such systems in public library information provision is now receiving very careful consideration in this country.

Hertfordshire Library Service was the first public library in the UK to purchase a computer terminal, early in 1976, for use with on-line information retrieval systems but the advent of BLAISE now opens up the market for wider use of terminals in public library systems for information as well as purely bibliographical housekeeping use (Dr Holmes of the British Library Bibliographical Services Division has described BLAISE in a recent article in *Aslib Proceedings*).[7] The longer term implications in the context of NATIS will be seen in the ultimate link-up with EURONET, the data telecommunication network which the nine EEC countries are setting up on behalf of the EEC Commission.

These systems can be regarded as a logical extension as libraries and information services become increasingly computerized but in VIEWDATA, public libraries can clearly see a strong competitor for the future as it becomes technically possible to connect every household in Britain with computerized information banks throughout the world.

Libraries will need to become closely involved both from the input side as with news agencies and the like, and in the provision of terminals, especially in the early days when costs will still be relatively high.

Teletext, in the shape of CEEFAX (BBC) and ORACLE (IBA) has an advantage in the absence of running costs and may well be a more attractive proposition for mass audience viewing, though hardly a serious challenge to library provision with such coverage limited to the equivalent of only 800 pages of information, in the initial stages anyway.

Information specialization

Whilst it would be foolish to attempt to overstate the role of the public library in any national information plan, there is one area of provision where it is surely pre-eminent. That is in the field of local studies, an activity where the public library generates its own specialists—people who consciously sacrifice career prospects to devote a working lifetime to the care and development of a collection which invariably has considerable significance well beyond the immediate area it concerns.

There is probably very little scope for the co-ordination of local studies material (and non-printed resources obviously have a special significance in this field) in that separate collections are, by their very nature, mutually exclusive. However, the local Studies Group of the Library Association is now bringing together, in regular consultation, the specialists concerned.

Archives

Any NATIS plan would rightly include archives as primary sources of information. Some librarians of the older school may feel perhaps that the sister profession has moved too far away from the days when it was summarily dismissed in one paper of the Library Association examinations. Those same people would maintain that the paramountcy of preservation has been somewhat overstated though this is, of course, a statutory requirement. As with rarer printed items, however, microfilming and similar aids can surely overcome many of the difficulties and in terms of use and exploitation (if archivists can accept that term) there is need for the services to come closer together. Not only local history libraries and record offices but also museums are likely to contain pictorial material of a similar nature—an area where the purist might seek some rationalization.

Newspapers

One of the most important resources of the local studies library is the file of local and regional newspapers, frequently dating from the late eighteenth century, which often provides the only contemporary reference to an event or personality of some historical interest.

The heavy use made of the original hard-copy files, coupled with the inbuilt deterioration of newspapers manufactured from mechanical wood-pulp has long led a number of public libraries to microfilm, often as a joint venture, with the newspaper company concerned and occasionally neighbouring authorities, with appropriate sharing of costs.

In June, the British Library issued a consultative paper on the *Newspaper Collections and the Future.*[8] Although this deals mainly with the way in which storage problems can be overcome and the implications of future microfilming proposals, mention is also made of the value of provincial newspapers to local libraries. The document states that the most heavily used parts of the collection at Colindale are the major national newspapers and from experience it is clear that the same is true of the provincial papers in local libraries. There is obviously scope for consultation and co-operation here and it is hoped that the document mentioned and the response it should evoke from various quarters will lead to a more equitable sharing of the burden in the interests, not only of more efficient services, but also economy and space. There will anyway be a need for the wider provision of the necessary hardware, especially reader-printers, and for the improvement of microfilm equipment about which the British Library Board has already expressed concern.

Information for councillors

A further example of the public library in the role of specialist information provider has emerged in recent years with the establishment of local government information services to council members and senior officers. The GLC were first in the field in the late 1960s and have since developed their service to a high degree but a number of other authorities have followed their lead, including my own county two years ago. The main activity is inevitably in the field of current awareness bulletins with some limited SDI Service and the co-ordination of information work in the various departments of the authority.

There is obviously considerable scope for co-operation in this field and the South Western Regional System is currently sponsoring a modest pilot scheme in which the ten county members share the abstracting of a selected list of periodicals of interest to councillors and officers in local government and associated subjects. These are then collated and distributed monthly by the Bureau for each authority to use as it thinks fit.

As this is a comparatively new service with good liaison between the small number of staff involved, there is scope for further and wider development at national level with the possibility of extension to other public services and central departments.

Colleges of further education

An area of comparative specialization in library and information services provided by local authorities is that of establishments for higher education other than those of university status—these are polytechnics and colleges of further education. In some counties the public library is the responsibility of the education committee and where this is so, there exists fruitful grounds, certainly on paper, for the close co-ordination of provision. Even in the remaining authorities, there is no reason why the pattern should not be closely interwoven even to the extent of common book stocks and joint periodical holdings. Where local schemes of co-operation for commercial and technical information services exist, much of the use will be borne by the polytechnic or college, especially where a specialist industry predominates, as well as the central public library. Even without the formality of such a framework, one-off arrangements of mutual benefit can be made.

Physical presence of the library and librarian

Notwithstanding the limitations of the public library in the field of specialist information, what is undeniable is that in most towns and even to a limited extent in rural areas, it has the most obvious physical presence with the local librarian usually well known as a prominent figure. The Library Advisory Council for Wales Report, stresses the value of regular personal contact, but of course credibility can only be sustained if the library comes up with the goods!

For the vast majority of people, other than the specialists who have a more likely source to which they can turn (though this will not always be easily accessible) the local library must surely be seen as the first port of call which, in other than the very small towns, will be equal to the demands in a significant number of cases.

I see a parallel in the Health Service. Just as the GP is available in the locality to deal with the more obvious and straightforward needs of his patients, so can the public library continue to act as the natural and immediate referral point for the man in the street. To continue the analogy, the librarian will need to refer his specialized enquiries to more intensive sources in the same way as the doctor acts as the key to the skills and knowledge of his consultant colleagues practising in more limited fields.

Our medical friends have their links firmly established in district, regional and national hierarchies. We in the world of libraries and information need to examine ours and this surely is what a NATIS programme is all about.

A further extension of the simile can be made. Local doctors have accepted for some years now the need to operate in group practices, sharing their resources at a common service-point. There is a further lesson for public librarians here. Though existing premises are all too often inadequate for the more obvious library needs, new purpose-built libraries can only rarely be contemplated in the present financial constraints. Nevertheless, when the opportunity arises following any future up-turn in the economic situation, the inclusion of other information and advice agencies—the Consumer Advice Centre, the Tourist Information Bureau, the Citizens' Advice Bureau and others, with appropriate consulting rooms—under the one roof must be seriously considered.

Conclusion

To sum up, NATIS in the UK will involve a comprehensive plan to re-jig the highly developed infra-structure of library and information services already existing. The programme must seek to bring together the wide complex of systems and schemes, with their attendant rivalries and jealousies so that a clearer pattern can emerge. The Dainton Report[9] saw the British Library as the apex of the structure. I think it would be equally apt to regard the public library system as the foundation.

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BRIEF REVIEWS

BLACKWOOD, J. W. *ed.* The future of library collections: proceedings of a seminar held by the Library Management Research Unit, University of Technology, Loughborough, 21st–23rd March 1977. Loughborough, LMRU, 1977. 83 pp. £3.00. (ISBN 0 904924 11 4.)

This seminar aimed to identify the issues which need to be investigated to provide the kind of information required for future planning. Papers were on: the Urquhart report; SCONUL's broad view; a case study of Aberdeen University and its plans for the future; depositories and storage; polytechnics and future collections; public libraries and self renewal; contribution of the British Library Lending Division. The papers are interspersed with discussion and the appendix has a list of research topics arising from discussion.

DOWNING, J. C. *and* YELLAND, M. *eds.* Dewey international: papers given at the European centenary seminar on the Dewey Decimal Classification held at Banbury, England, 26th–30th September 1976. London, Library Association, 1977. 176 pp. £3.25 (£2.60 to LA members). (Library Association Research Publication no. 19.) (ISBN 0 85365 469 7.)

This conference was sponsored by Forest Press and the Library Association. The following papers were presented: the Decimal Classification and its international commitments; the Decimal Classification and its place in librarianship in North America; the Decimal Classification in Britain and the role of the Library Association Dewey Decimal Classification Subcommittee; the role of the Editorial Policy Committee in the development of the Dewey Decimal Classification; how an edition of the Dewey Decimal Classification is prepared; the Dewey Decimal Classification in Birmingham Public Libraries; le problème de la traduction dans ses rapports avec l'édition française de la classification décimale de Dewey (CDD); the French public libraries and the Dewey Decimal Classification; the relationship between the Dewey Decimal Classification and the Universal Decimal Classification; the Dewey Decimal Classification and its place in universal bibliographic control; the Dewey Decimal Classification and automated subject retrieval; the Dewey Decimal Classification in library education in Great Britain; the present Spanish translation of the Dewey Decimal Classification. Appendixes include a reading list on the DDC of material produced since 1971 and a survey of the use of DDC for teaching.

LANCASTER, F. W. The measurement and evaluation of library services, by F. W. Lancaster with the assistance of M. J. Joncich. Washington, Information Resources Press, 1977. 395 pp. $27.50. (ISBN 0 87815 017 x.)

Evaluation is the comparison of performance with the objectives of the agency to find out if there has been any change, if such change has been for the better, and to what extent. Evaluation requires specific objectives and easily applicable measurement tools. Libraries rarely have either of these. This book reviews and examines attempts to devise valid measures of library service. The emphasis is on evaluation and its perspective; evaluation must be in terms of immediate and tangible user needs. Topics covered are: studies of catalogue use; reference service evaluation; literature searching and information retrieval evaluation; collection evaluation; document delivery capabilities evaluation; range and scope of library services; technical services evaluation; evaluation of automated systems in libraries; relevance of standards to library services evaluation; library surveys; effect of physical accessibility and ease of use; cost-performance-benefits consideration; factors affecting the performance of library services.

PINCHUCK, ISADORE. Scientific and technical translation. London, André Deutsch, 1977. 269 pp. £6.95. (ISBN 0 233 96515 7.)

The qualitative importance of technical translation activity throughout the world far outweights its financial significance. It is an integral part of modern technology, which is international and depends on the transmission of ideas across language barriers. The underlying viewpoint of this book is that translation is a type of information transfer, the transfer of information expressed in one language into the terms of a second language. It is based upon the study of the theory of translation and upon practical experience in the Foreign Language Information Service of the South African Council for Scientific and Industrial Research. Although confined to translation from German to English, the principles outlined should have some application to scientific and technical translation in general. The limitations of certain concepts and procedures are indicated, but solutions to some problems encountered in translation are exemplified. The following chapters are included: technical translation and information; the nature of language; what is translation? units of translation; the language barrier; grammatical range; word formation; sentence patterning; lexical structure; situation; technical language; standardized terminology; translation procedures; adequacy; dictionaries; machine translation; extra-linguistic sources; competence and performance.

SCHWARZ, S. *ed.* Knowledge and concepts in futures studies. Colorado, Westview Press, 1977. 243 pp. $15.00. (ISBN 0 89158 220 7.)

This book originates from a research project sponsored by the planning division of the Swedish National Defence Research Institute. A seminar was held in September 1974 where preliminary results were presented and discussed. The following papers are included: information, awareness and the role of futures studies in decision-making, by Stephan Schwarz; there is no naïve way of making forecasts, by Martin Edman; a conceptual framework for trends and trend extrapolation, by Gunnar Näsman; the concept of forecasting—a discussion, by Hans Stenlund; some methodological problems in futures studies, by Bengt Hansson; well-informed ignorance in forecasting—a Bayesian analysis of prognostic reasoning, by Sören Halldén; some conceptual problems in long-range planning, by Brita Schwarz; how is it possible to evaluate propositions about the future, by Håkan Wiberg; rational arguments—on the role of norms and values in futures studies, by Göran Hermerén; on advice and criticism in decision-making processes, by Stephan Schwarz.

SIMPSON, N. Training in libraries: report of the Library Association Working Party on Training. London, Library Association, 1977. 28 pp. 75p. (ISBN 0 85365 339 9.)

This working party was set up in January 1975 to 'consider . . . what specific steps should be taken to improve the standard of training in libraries'. The report aims to present a summary of training practice and to consider some topics of particular interest to training specialists in libraries. A sequel to the report will consist of a series of guidance notes for practitioners of training on selected training topics. The report discusses identification of training needs: training is important for maximum exploitation of resources. Methods of training include: on-job/individual training, internal courses, external courses. Assessment of training effectiveness includes consideration of levels of measurement, gain in learning, and effect on job behaviour. Appendix A is a checklist for managers on identifying training needs. Appendix B is an analysis chart, showing how to assemble information on training needs and possibilities into a usable form. Appendix C shows how to tabulate the many things in common among the areas and levels of training in all kinds of libraries.

UNISIST international symposium of information systems and services in ongoing research in science. Budapest, Hungarian Central Technical Library and Documentation Centre, 1976. 469 pp. (ISBN 963 592 062 8.)

This first symposium for UNESCO member states was organized by UNESCO in collaboration with the Smithsonian Science Information Exchange and held in Paris, 27th–29th October 1975. The papers are divided into the following sessions: perspectives: ongoing research information in the service of science and science policy; existing and emerging information systems: problems of development and operation; problems and methods in the collection and processing of ongoing research information; meeting user needs: current services and future possibilities; international exchange: its value and mechanisms for accomplishment. Delegates from developing countries were particularly concerned and interested in creating specialized services which would, in turn, exchange data internationally.

VAN NOSTRAND'S Scientific Encyclopedia, 5th ed., *ed.* D. M. Considine. New York, Van Nostrand Reinhold Company, 1976. pp. 2370. £55. (ISBN 0 442 21629 7.)

It is in the nature of a scientific encyclopedia that a new edition after eight years will require considerable revision, and the claim by Van Nostrand that the 2370 pages of the fifth edition of *Van Nostrand's Scientific Encyclopedia* include less than 20 per cent of the material taken from the earlier edition demonstrates how seriously this responsibility has been taken. A corresponding increase is seen in the number of contributing editors, no doubt required by the expansion of scientific knowledge coupled with an increased subject specialization by individuals. However, in spite of the specialized knowledge of the contributors the encyclopedia itself is aimed at non-specialists and the entries do indeed provide concise explanations, illustrations where appropriate and sometimes further references. The clear format of the fourth edition is retained and ample cross references continue to be provided. This encyclopedia has already established its reputation in previous editions and it will be difficult for a library which has already recognized the value of previous editions to justify not purchasing the fifth edition which is on the one hand substantially (over 80 per cent) a new volume but with the same high standards of its predecessors.

VOEGELIN, C. F. *and* VOEGELIN, F. M. Classification and index of the world's languages. New York, Elsevier, 1977. 658 pp. $39.95. (ISBN 0 444 00155 7.)

This volume is partly based on an earlier survey of the literature, *Languages of the world*, published 1964–66 as separate numbers in *Anthropological Linguistics*. Using comparative methods this shows the range and relationships in the phonology and grammar of natural languages. It demonstrates the complexity and grammatical subtlety of languages and societies with underdeveloped or promitive cultures, which are no less elaborate than languages spoken in societies with sophisticated technologies. Related languages are discussed in groups of purported genetic units, claiming that those within the groups are more closely related than those outside the groups. Tribal and regional dialects are also included. The name of a group of related languages is used for the title of the entry, subgroups follow; the names of the dialects spoken are given with the number of speakers and their location, when known. Dialects or languages no longer spoken are indicated by an asterisk.

WRIGHT, H. C. The oral antecedents of Greek librarianship. Provo, Utah, Brigham Young University Press, 1977. 237 pp. £15.00. (ISBN 0 8425 0623 3.)

In the foreword Jesse H. Shera discloses that the author has attempted to get beyond factual data to the cultural milieu from which the library emerged and to examine these developments in advance of Greek culture which brought Greek libraries into being. The major theme is the emergence of the library in the transition of a culture from an oral to a written tradition. The book utilizes ancient history as a means of studying information, following the process of informational output in humans. This begins with abstract thought in the human mind and ends with concrete expression in the world. The book follows the same route: beginning with a philosophical piece doing the groundwork for an informational view of history and shifting to discussions of specific aspects of Greek culture, including writing, social organization, illiteracy and literacy, and the beginnings of the Alexandrian library movement. There is a thirty page bibliography.

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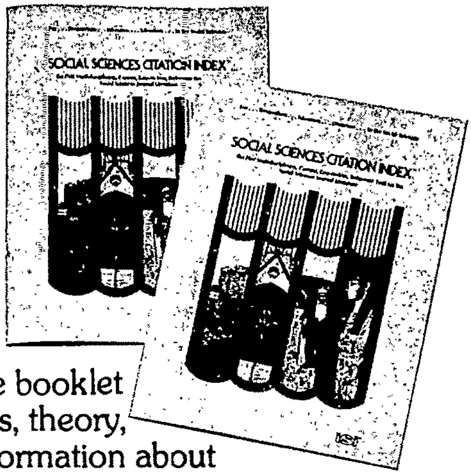

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Nor would it reach members of the general public whom the Act was intended to protect.

We decided, with considerable misgivings, that we had really no alternative but to take advertising space in the National Press (as well as in more specialized papers). The new Act was so complex that we obviously could only set out some main points in the advertisement. We therefore decided to print leaflets on how the Act affected various groups of people and included coupons in the advertisements which could be used to ask for specific leaflets. There were two interesting points about the campaign which we carried out in March/April 1975. We asked an agency to design an advertisement in consultation with our own information branch. To my surprise, the agency produced an advertisement which contained more text—more facts—than I had seen in a national press advertisement of this kind. I queried whether many people would read through such a long text. But one must trust one's professional advisers, and I have little doubt that their judgment was right because the second interesting thing was the response to the coupons offering leaflets. We received 50,000 requests and distributed in response some three-quarters of a million leaflets. Even more interesting, about a third of these requests were for the leaflet on how the Act affected workers. We were expecting a lot of enquiries from *employers*—after all the main weight of the new duties falls on them. But we had been much less certain whether individual workers would write in.

These advertisements and the leaflets were intended to tell people that something new was happening. Of course we used many other ways of telling people: articles in papers, meetings arranged by multifarious organizations, seminars and so forth. I cannot claim that everyone who ought to have heard of the new Act has done so, but a surprisingly large number have.

But of course none of this told anybody precisely what they needed to do to comply with the new Act, and it is to that problem I now turn.

Advice and enforcement

Faced with the wide-ranging general duties it is natural for people to ask the Executive and its local Inspectors what they have to do to comply in particular cases. There are two aspects to this. First the *identification* of risks to health and safety. Secondly the assessment of what can be done to minimize risks, and in particular what it is 'reasonably practicable' to do in a particular case.

We certainly regard it as a responsibility of the Health and Safety Executive to help in the business of *identifying* risks, and informing people concerned that they exist. This is particularly important for hazards which are neither simple nor obvious. Chemicals used in industry may damage the health of some of the workers using them. But this may only become evident over long periods of time and only through the carrying out of large-scale and protracted studies. Major chemical plants may (as the Flixborough explosion revealed) contain the seeds of a major disaster which will only be evident to experienced engineers or chemists studying in detail the design of the plant.

The problem we face in the Executive is threefold. First, to recruit and keep professional and scientific staff capable of identifying at an early date new hazards to health and safety. Secondly how to communicate accurate and intelligible information about these risks not only to the Scientific Advisers of major companies, but to the many people who may be affected (a potentially toxic material may be widely used in small firms). Thirdly, and this is both important and difficult, we must avoid taking over from industry—from designers and manufacturers—the responsibility for identifying risks which they may be creating for their workers or the public.

To identify risks is one thing; to suggest ways of minimizing them is another. It is our business in the HSE to enforce the law, whether this be the general duties I described earlier or the mass of detailed regulations. But it is natural for someone running a factory or a hospital or a shipyard to ask our Inspectors 'how do we achieve this—how far do we have to go to cut down the risks?' If we have laid down a maximum level of contamination of the air in a factory, we may be asked what sort of ventilation system would achieve this. If we require testing of a chemical to make sure it is not toxic we will be asked what kind of testing ought to be undertaken. Sometimes one can give general guidance: more often the guidance has to be relevant to a particular factory situation.

These requests for help and advice create a dilemma for us. It is obviously reasonable that people should seek information and advice from us. Our staff will often have wider experience than an individual factory or office can possibly have. But on the other hand our staff are limited in number. Solving particular problems may absorb more time than we can devote without neglecting other duties. And even more difficult for us, the employer, the designer or the manufacturer is visibly transferring the responsibility for failure, for breakdown, from his shoulders to ours. Every time we 'approve' something, every time one of our staff says: 'That should be OK', we reduce the pressure on people to carry the responsibility themselves. Yet it is essential to the philosophy of the new Act that 'industry' (and that term is meant to include every organization: local authorities, universities, hospital boards) must accept responsibility for coping with its own hazards.

No one can rely on the HSE to take over this responsibility. And therefore management of all these organizations must put itself in a position to know about potential hazards, to assess their importance and to have the know-how to reduce them as far as practicable. What demands will that make on information services?

Information requirements of the new act

The Act is based on the knowledge that risks cannot be wholly eliminated. It is essential to tell people about risks, and how they can be minimized. The following provisions are included in the Act:

(1) Employers are required to provide their workers with *information* (as well as instruction and training) so as to ensure their safety and health.

(2) Manufacturers of articles and substances for use at work are required to make available *adequate information* about their use, about relevant tests and about the conditions under which they may be safely used.

(3) Employers (and self-employed persons) can be required to give people other than their workers—including the general public—*information*

about any aspect of his business which might affect their health and safety (regulations on this point have not yet been made).

(4) The Health and Safety Commission has a duty to make arrangements *to provide an information and advisory service* for all concerned with health and safety matters, to carry out research, and also publish results of research and provide (and encourage the provision by others) information about health and safety.

(5) Inspectors of my Executive have a duty to give to workers or their representatives, where this is necessary to keep them *adequately informed* about their health, safety and welfare, *factual information* about the premises where they work and *information* about any action the Inspector intends to take.

(6) The Employment Medical Advisory Service (which is part of my Executive) has the function under the Act of keeping everyone concerned with the health of employed persons informed of matters about which they ought to know in order to safeguard and improve health.

In addition to these provisions specifically concerned with information, the Act provides for the appointment in workplaces of safety representatives and safety committees which will discuss health and safety matters with employers. This will certainly give rise to new demands by these representatives for information about hazards, from their unions, from the Executive and from employers.

In my view these provisions will force us all to substantially improve the present arrangements for access to information on health and safety problems.

Employers, particularly in the larger firms, will need substantially to improve their own resources for providing information to management, to workers and to their customers. More questions will be asked and the information resources of firms will have to be improved so that they have, or can quickly obtain, answers to these questions.

This in its turn will put additional demands on external information sources including ordinary library facilities as well as the resources of trade associations, research associations and so forth.

It will also lead—it is already leading—to additional demands for information from my Executive. The answering of individual questions is often burdensome. We try as far as possible to produce books, pamphlets and other material which will answer the generality of questions. I regard the production of technical and scientific information related to health and safety hazards as a vital part of our work. But we have no desire whatever to establish a monopoly in the provision of either information or advice. Nevertheless, we have initiated in certain areas a major information effort. It may be of interest to indicate how the resources of the various Inspectorates forming the Executive are being re-organized and expanded to form a comprehensive Information and Advisory Service.

As a first step we have created a structure to undertake the functions normally associated with Information Services of Government Departments. This embraces the various promotional activities of a publicity nature (press relations, advertising, publications, exhibitions, etc.) plus more specialized activities such as demonstrations, technical films and photography, exhibitions, etc. This latter group are closely allied to the medical, scientific and technical matters with which our research establishments are concerned.

As a second step, we are co-ordinating existing ancillary services and examining new facilities to enable us to develop the type of comprehensive service necessary to effectively carry out the needs of HSE and meet the earlier mentioned requirements of the Health and Safety Act. These embrace: Library Services (including Information Retrieval); General Enquiry Services; Area Office Advisory Services, etc.

These two distinct but closely related areas of activity will be developed as a single unit to form a Directorate of Information and Advisory Services to both support the activities of the various Inspectorates and also provide the necessary services for external communications activities.

Libraries

Within such a framework a major requirement is obviously a sound library structure and we have taken the necessary steps to consolidate our four existing libraries into a unified library service as part of the Directorate of Information and Advisory Services. This will make possible the necessary uniformity of procedures and parallel development and, at the same time, maintain the high degree of specialization that will be necessary.

Our four libraries include a main HSE library in London with 7,000 books and taking 350 periodicals plus three libraries at our research establishments with more than 20,000 books.

The inclusion of the Safety in Mines Research Establishment library makes us particularly strong on mining problems. We will also extend our libraries by the transfer of relevant material from those Government Departments from which Inspectorates have transferred. For instance, we will take over material concerning safety in nuclear matters from the library of Department of Energy.

The eventual result of this development will be a library that will be unique in terms of Government library services. Whereas other Government Department libraries operate on a basis of individual specialization based on Departmental functions, ours will function on a very much broader base to embrace the full range of activities from technology and science on the one hand to legal matters and health on the other.

In this sense I see our libraries as becoming, in due course, the central source of information on all matters concerning health and safety.

Abstracts

We at present run two major Abstracting Services. The first is a bimonthly publication concerning Mining Safety—about 1,200 abstracts a year. Our Medical Services produce 600 abstracts a year on occupational health and related problems. We are also introducing a service of providing an index based on brief abstracts or titles to service the expanding force of inspectors. We are at present carrying out feasibility studies to determine how best to put our abstracts on to magnetic tape for computerized retrieval. We are contemplating an extension of our abstracting service to perhaps double its present size, considerably extending its scope (though we must be careful not to duplicate the work of the CIS Abstracts of the ILO).

Slides and photographs

Because of the nature of our business, pictorial records are of considerable importance. As an example, some hundreds of photographs and many thousands of feet of film were taken in connection with the Flixborough disaster. Pictorial records of this type form a vital part of any inquiry process and will be of considerable value in helping to prevent recurrences of such disasters.

Within our London HQ library structure we are establishing a comprehensive slide and photographic library to embrace existing collections of all Inspectorates, EMAS and SMRE material and expand these as necessary.

Publications

We have a substantial programme for reviving existing booklets on particular health and safety hazards, and for producing new ones. Some of these are aimed at specialist workers concerned with particular problems. But the great bulk of our effort will be designed to produce material which will be of use to line management in medium and small firms, and to workers and their representatives.

Many of our publications will fall into the category of reference material. For example, the Report on the Flixborough Inquiry and reports on specialized subjects such as falsework will be regarded as reference works on the particular subject matter and provide basic guide lines for concerns engaged in the relevant fields.

By far the biggest problem we face is, in my view, the preparation of information material on health problems where the risk to the worker is by no means easy to evaluate precisely. A chemical used in industry may be thought to involve a health risk. The evidence may be from animal experiments, from analogy with similar substances or from long-term studies of the health of workers exposed. The precise extent of the risk may be difficult to state. In particular the risks related to any particular level of exposure or of absorption into the body may not be at all precise. We want workers handling the product to realize that there is a risk and to take certain precautions. But on the other hand, we must avoid causing undue worry—let alone panic. To prepare information material which can be given to all workers, will be understood by them, will be as accurate a statement of the known facts as possible and which will not cause alarm, is a skilled and difficult job.

Conclusion

We are only at the beginning of a long drawn out task of creating an informed attitude to health and safety problems. I have spoken about work problems but similar problems arise on the road or in the home. Looking at the toll of death and injury—perhaps 3,000 deaths and 10,000 serious injuries a year—people and Parliament call for more regulations, more legal enforcement. Yet none of that can be effective unless we can create *understanding* amongst management and workers of the nature of the problems, and a desire to improve the situation.

It is this task of education and information which is central to any effective attack on this as on so many other problems which we face. In this connection, I confidently expect that *the system* we are developing will become recognized as a unique information storage, retrieval and servicing structure to serve the whole community.

DISCUSSION

D. B. HOWELL (British Steel Corporation). Threshold limit values for toxic substances in the UK are based on American values. In the USSR, TLVs are set at zero, as they consider that if a substance is toxic there should be no exposure. What is Health and Safety Executive's view on this?

JOHN LOCKE. One can't generalize on this. I wouldn't accept that if a substance is toxic the exposure is nil. Steps must be taken to see what action can be applied. These might be using a substitute or calculating the cost of developing an alternative. The problem is who ought to make the decision on this. It is, of course, why we need extensive R & D teams.

G. L. FISHER (Sheffield City Council). Does the Act go far enough? Does it cover the housewife whose workplace is in the home?

JOHN LOCKE. Articles used at work are also used at home. The situation is that we can produce articles which are safe, but the problems are of maintenance and policing their use in the home.

V. T. H. PARRY (Royal Botanic Gardens, Kew). Does the Act cover the employer and worker when the worker is taking part in recreational activities provided by the employer (*e.g.* playing table tennis in the lunchhour)?

JOHN LOCKE. There has been a long series of cases of this type under civil liabilities and if they're covered under that, they are covered under this Act.

JOHN WIDDOWSON (Technical Help for Exporters, BSI). There are significant occupational safety and health regulations in force in Germany, USA, Italy, etc. Would you comment on these and current and proposed UK regulations?

JOHN LOCKE. The problems in the export area are those of standards. We have to work through the EEC, which is an enormously long job. It should be that major industrialized countries get together to decide on standards.

GRETCHEN TAYLOR (Offshore Information Literature). What is the position of your department regarding the provision of publications for safety in North Sea oil rigs, diving, etc? Also on the onshore construction of platforms?

JOHN LOCKE. We are not responsible for activities outside territorial waters. We are responsible for rigs being assembled and maintained. There is an attempt to bring all material on diving together because of its present fragmented state.

A. CAWKELL (Institute for Scientific Information). You did not mention the effect of publication on your Act. It is important to publish statistics which show the effect of chemicals, etc., and declining effects once a person has been affected. Do you have a statistics department?

JOHN LOCKE. Yes, we are setting up a large statistical department to monitor all manner of information which comes within our brief. We carry out long-term studies to collect this information and publish reports from time to time.

Education in the use of information in university and academic environments

M. B. Stevenson

University of Sussex Library

Paper presented at the 49th Aslib Annual Conference, Van Mildert College, Durham, 22nd–25th September 1975

IN DISCUSSING THIS TOPIC at an Aslib Annual Conference one is very conscious of the role past annual conferences have played in the development of this subject field. The first paper of note in this country on the theme was delivered by H. E. Potts at the 1926 conference.[1] At the seventh annual conference in 1930 a resolution of the general session recognized the vital need for training students in the efficient use of libraries and urged university and other education authorities to consider the organization of systematic instruction in this subject in all faculties. More significant was Hutton's paper in 1942[2] which listed the objectives of such instruction—no one had done this previously and very few have since. One is also conscious of the fact that no action was taken as a result of these three initiatives—so it is with no great hope for change that I speak today.

It is not quite true to say that nothing happened as a result of the Hutton paper, which was re-presented to the 1948 Royal Society Scientific Information Conference. After discussing the recommendations arising from the conference a Library Association Working Party, having stated that instruction in the use of libraries and in bibliography was an essential part of the education of scientists, went on to suggest a three-stage programme of implementation. All three stages of this programme—introduction to the library for all new undergraduates and postgraduates, an introduction to bibliography at the end of the first or beginning of the second year, and advanced bibliographical method for postgraduates—were to be carried out by librarians because of the lack of training of academic staff. Other developments since 1948 are documented elsewhere.

What of the situation today? Librarians certainly place a high priority on user education believing it to be an essential part of their function. However, despite the considerable changes in universities, in courses and their content, in teaching methods, and in libraries themselves the pattern adopted is with one or two exceptions still basically the same as the 1948 recommendations. One reason is that librarians are still searching for the answers to fundamental questions to which it would have been gratifying, if as a result of the OSTI Information Officers project, one had been able to provide convincing answers. These questions are 'what needs to be taught about information in universities, when should it be taught, how should it be taught, where should it be taught and

Aslib Proceedings, 28 (1), January 1976, p. 17–21. Printed in Great Britain

what are the benefits derived from teaching it?'[3] It was unreasonable perhaps for so many questions to be answered in such a project but until answers to these fundamental questions are found, advances in user education are going to be slow. A state-of-the-art report to be presented to the British Library Research & Development Department in November will present the collective views of librarians on the present situation and future possibilities.

The general consensus of the aim of library instruction seems to be to enable the student to achieve maximum utilization of library sources and services during his academic course or that the student will be enabled to effectively and efficiently use the library. A minority believe that before this can happen the user must be put into the right frame of mind with respect to the library, that the primary aim is to create in the user a favourable state of mind about libraries in general and one library in particular—a fact recognized by Line in 1963[4] but which has generated little action since then.

Discussion of aims in these terms leads on naturally to a consideration of orientation. The traditional pattern of talks, tours, tape-slide presentations, printed library guides is still very much in evidence, though tours are no longer considered essential and are omitted by several libraries. The library guide which many librarians admit is not read and of little value in its present format is still produced however. One interesting variant is the Trent Polytechnic publication *The Library—What's in it for you?* This continuing affection for the traditional methods led Ford to comment in 1973[5] that 'the lecture given to freshman students at the beginning of their first session must surely be a waste of time. The library with its vague connection with academic work can hold little attraction for a student struggling to adjust to university life. The tours which are often associated with such lectures similarly rely on the students' overtaxed memories for their impact. All too often the librarian slips into jargon or relapses into an uninspired statement of rules and regulations.'

Such comments though valid do not destroy the need for some programme for new students—a programme properly designed to enable the achievement of the objectives set for such an introduction. However to talk to most librarians of the use of affective rather than cognitive objectives is at present out of the question. This is one of the greatest problems user education faces—librarians are not skilled educators. Most realize that there is something wrong with what they are doing but do not know how to do anything about it. Experiments at the University of Sussex[6] designed to help change the pattern of library introductions have confirmed the old saying that students learn by doing, not by being told. Alternatively, as Line puts it 'library information use is a practical skill, not something to be taught like history. It is a skill one picks up and acquires facility in through continued practice.'[7] Practical work is therefore in some form essential. Even so one would hope that he would admit that this requires some introduction (though not necessarily instruction) in terms of basic library skills. The problem is we waste too much time and effort explaining away problems of our own making, our professional mysteries, time and effort that could be more valuably spent making our libraries easier to use and understand. Before thinking about courses on bibliographic instruction, therefore, it is necessary to get the library right. It is no use banner waving if you have not got the basics right, and nowhere could this be more true of the guiding of our buildings.

Bibliographic instruction skill follows the traditional pattern. Formal courses are given lasting from one to twenty hours using adaptations of the British Library Lending Division course outline. Varying amounts of practical work are included, the assessment of which is now being taken more seriously. One other change is the trend towards smaller groups and seminar teaching. The fact remains though that aims and objectives are rarely formulated, that there is a lack of clarity of the needs of the groups instructed and of the levels of knowledge and application to be reached. Other well-known problems still persist, in particular when to give courses to achieve maximum motivation on the part of the students and that 'area rich in speculation but uncommonly poor in demonstrable fact'[3]—evaluation. At present instruction is provided on intuition alone, an error that could be avoided by proper evaluation and feedback. Librarians tend to assume, probably because of the evaluation methods employed on tape-slide presentations, that evaluation is very formal and involves pre and post tests. There are other alternatives especially of informal evaluation and these ought to be considered seriously in the context of user education, especially the technique known as illuminative evaluation.[8]

One personal observation I would like to make with regard to the attitude of librarians towards user education. The justification for the involvement of librarians in courses mentioned in 1948, namely that academic staff were not able to give these courses, is still a widely held belief. This seems to be a slightly arrogant stance to adopt when one considers experiences like that of Elizabeth Corney mentioned by Martyn.[3] Two questions immediately are presented. One is to ask why do we not instruct the academic staff? The other is to ask whether, if academics are unable to give courses, librarians are any better qualified? There is certainly no common conception amongst librarians of the qualities and qualifications required to do the job but there is a strong feeling amongst those doing the teaching that library school did not prepare them for their task.

The question as to whether instruction is being provided in the most appropriate manner has not been seriously considered. This is unfortunate since a lot of the problems faced and admitted by librarians in the approaches they adopt at present stem from the fact that we still think and talk in terms of instruction and not in terms of education (though in university circles librarians are by no means unique in this respect). Our emphasis remains on teaching rather than guided learning.

What alternatives are possibilities for consideration? The most obvious is to improve the basic existing three-stage course by more clearly defining objectives, by looking more closely at teaching method and above all by proper meaningful evaluation to highlight the necessary changes. Personally I do not believe this is where we ought to be looking. Times and needs have changed such that we ought to be seeking alternative new methods, but again only after a proper evaluation of the needs of the user.

Possibilities that suggest themselves for consideration are a move away from formal basic instruction which cannot deal adequately with individual specific problems, to a greater personalization of our educational role on the basis of

1:1 help. One notable example of its implementation is at the University of Durham in the field of politics and history. This approach has obvious limitations, particularly its labour intensive nature. One must also bear in mind the fact that it is not an answer in itself because not everyone who needs help will ask for it.

Other alternatives have been suggested. Closer co-operation with academic staff is seen by many to be the key to solving the problem of the motivation of students and also of providing a greater relevance to the courses. In this respect integration—a word not uncommon in educational circles—has taken on a new meaning. Unfortunately, that meaning is different for different people. It certainly does not mean the insertion of traditional library and bibliography lectures into existing courses to give them some respectability though this in itself may have some value. It is also unlikely that the ultimate in integration, the library college concept, will be of practical application in this country. Somewhere between the two there may be a path worth pursuing. There is the danger associated with 'in' words and ideas that they are accepted uncritically and are seen as the panacea for all ills. It is necessary to ask seriously, integration of what? If the answer is information handling with the learning of the subject then the teacher and the librarian are going to have to become involved in curriculum design. To a greater or lesser degree this is happening in polytechnics where submissions to the CNAA for degree courses very often now include an element of bibliographical instruction integrated into departmental courses.

However, the more I think about the future the more I like the idea of Richnell who, when considering the implications for user education of the 1964 Hale Committee Report on university teaching methods, suggested that 'library instruction units consisting of members of academic staff with library qualifications and experience who are clearly recognized as members of the teaching staff in the faculties, are needed to organize, prepare and carry out classes in library use.'[9] The concept may require refinement possibly taking into account the current interest in teaching and learning problems in higher education. Library and information use can after all be seen as a study problem, a technique to be acquired, as for example note-taking or critical reading. An involvement with teaching and learning problems will also require the person to be involved in course design. Alternatively, the concept of 'library instruction units' could be linked with Line's information officers to produce a meaningful way forward.

In such a short time it is difficult to convey more than an idea of the discussion and debate that is taking place in the field of user education at the moment. In particular I have hardly touched on the theme of evaluation which will be more fully discussed in the report to the British Library Research & Development Division mentioned above.

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DISCUSSION

MR M. B. LINE (British Library Lending Division) said that much effort could be directed to teaching people to use library systems that seemed to have been designed without users in mind. All librarians should occasionally use other libraries without seeking help.

Most of what was done at the higher education level was remedial, retraining people who had been quite wrongly trained in information handling at school, trained to passive reception rather than active learning. Somehow ways must be found of integrating the use of information into the whole of education from the time the child starts school.

DR STEVENSON said he was not quite so despairing, he hoped for change from the contact between schools and community libraries. He quite agreed with the first part of Mr Line's remarks.

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Education for information and library work

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Paper presented at the 49th Aslib Annual Conference, Van Mildert College, Durham, 22nd–25th September 1975

IN THE LAST FEW YEARS there has been a marked widening in the employment possibilities for information scientists. Apart from the traditional outlets in special libraries and in information departments in the science based industries, they have been recruited by local government planning departments, accountants, merchant banks, specialist publishers, law firms, etc. Even with the traditional employers their range of activities has increased. In the pharmaceutical industry, for example, this trend has been catalysed by the 1968 drug registration legislation. Furthermore, work such as Dr Stevenson has just described[1] is slowly bearing fruit and producing a more information conscious clientele.

Educationalists are normally thought to be rather slow in responding to opportunities. In this case, the response was relatively rapid. In 1973, with the aid of a grant from the Nuffield Foundation, the University of Sheffield introduced its MA in Information Studies (Social Sciences) which also covers legal information. It was immediately successful and rapidly achieved its target intake of students. In the 1973–4 session we decided to review our own M Sc in Information Science. We started by looking at recent job advertisements and identified two specialized areas where there seemed to be a demand for information scientists and special librarians. These were the handling of biomedical and pharmaceutical information and of financial and commercial information.

We quickly found that the Library Association had established a Working Party on courses in the commercial information field and we received much valuable help and advice from that source, as we also did from our friends in medical libraries and pharmaceutical information departments. On examining our course it was easy to see that much of the material was more or less subject-independent but that some, mainly bibliographical, was strongly subject-dependent. Thus, the mainly subject-independent material was designated as the core modules of the course to be taken by all students. In these core modules was included some basic material on sources so that anyone who subsequently took one of the specialized options would still be able to function effectively outside these specialized areas. Towards the end of the lecture course in the 1974–5 session, optional courses on the handling of biomedical and pharmaceutical information and of financial, commercial and legal information were introduced as alternatives to a course on the handling of scientific and technical

Aslib Proceedings, 28 (1), January 1976, p. 22–29. Printed in Great Britain

information treated in a more general manner but with some emphasis on the physical sciences and technology.

All three options consisted of lectures by internal and visiting lecturers, seminars, visits and integrated practical work. Mrs Kostrevski organized the programme for the biomedical and pharmaceutical option, and Mrs Rennie that for the financial, commercial and legal option. The options were well received by the students and also generated favourable comment among potential employers. We will be offering these options to the second year of our day release Diploma course in the 1975–6 session.

The Diploma course has always had a very similar curriculum to that of the full-time M Sc, the major difference being the thesis requirement of the latter. Last year enrolments reached a record and of these the highest percentage ever passed through to the second year of the course. It attracts a very heterogeneous group of students with respect to employer, subject background, qualifications and age.

Continuing education and qualification enhancement

The Diploma, like the M Sc, carries full exemption from the examinations of both accrediting bodies in the field. This is equitable since the major difference in course content is the thesis requirement of the M Sc. The knowledge required for professional competence should largely have been learnt by the time the thesis study is undertaken. The discipline required to produce a thesis is certainly a useful rounding process in the education of a Chief but may not be quite so necessary in the education of an Indian. I believe that library and information science educators, particularly in North America, have gravely underestimated the socially disruptive dangers of producing too many Chiefs and not enough Indians. In times of stagnant promotion prospects this can cause considerable frustration among those trained to be potential Chiefs.

However, in keeping with the democratic ethos we must give Indians the opportunities to acquire the qualifications of a Chief. The name of this game is continuing education or qualification enhancement. American Library Schools have been quite active in this field for some years. This is partly due to the American system of transferable degree credits (which Roy Stokes, when he was still in England, described as 'the trading stamp mentality'),[2] but was given a considerable boost by the US Office of Education's financing of institutes and workshops in the late 60s and early 70s, where participants were paid to attend.[3] In 1973 the Association of American Library Schools sponsored a workshop on continuing education in professional associations. In 1974 ASIS published a couple of overly long reports by Stone[4,5] on this topic. The first of these contained an annotated bibliography of over 800 entries which one would have assumed was reasonably complete, being published by ASIS. On checking through I found very few European papers noted and quite a few American ones missing.

During the past decade our University Library Schools have been enrolling graduate librarians and non-graduate FLAs for part-time research degrees, mostly at the Master's level. Many have, of course, been library school teachers; College of Librarianship Wales, in particular, has very generously given many of its non-graduate staff a year's study leave. A few public librarians have also been enrolled for such studies, notably at Strathclyde. Their needs are perhaps better catered for by schemes involving formal course work at University College London, at Loughborough University of Technology and at Leeds Polytechnic. A few librarians have also been accepted for research degrees at one or two Universities which do not have library schools. We have a few industrial librarians and information scientists registered with us for M Phil degrees but I do not believe that the total number from this group registered at other universities is very large. This is, perhaps, surprising since there appear to be many thesis-worthy projects going on in industrial libraries and information centres. As mentioned earlier there is no doubt that the effort of carrying out the necessary research and writing the thesis does impose a certain intellectual discipline which is educationally valuable. It can also function as a useful mid-career refresher course.

This year we are offering our Diploma holders the opportunity to convert their Diplomas to M Sc, subject to meeting M Sc admission requirements. As they have three years from obtaining the Diploma to register for the conversion course in which they produce an M Sc thesis, this provides a certain measure of continuing education as well as qualification enhancement. It is the nature of many of the thesis topics suggested by the first batch of conversion students that makes me believe that there is a quite substantial number of industrial information scientists who could enrol for higher degrees.

The major area of continuing education is, however, the provision of short courses, workshops, etc. These do not normally lead to qualification enhancement except for the very small number involved with the Library Association's Mature Entry Scheme. As Aslib is the major provider of such courses and as Margaret Slater has carried out a very extensive survey of needs in this area, I will merely commend her report to you (Aslib Occasional Publication no. 15). We have, however, analysed those returns by members of the Institute of Information Scientists, and a report was prepared for the Institute's Education Committee. Information scientists perceive a need for courses on management and associated techniques and to a somewhat lesser extent on other techniques, especially those involving computers. Their ideal short course would be of three days' duration, residential and held in the South East between September and April, but preferably not in December or January. It is possible that the above preferences of Institute members, who constituted a relatively small part of Margaret Slater's sample, may not be typical of the group as a whole.

Teaching automation

One of the problems in teaching anything connected with computers to librarianship and information science students is the very great heterogeneity of backgrounds, subjects and attitudes. Students can range from computer science graduates to very traditional arts graduates and their attitudes from slavish adulation to petrifying fear. Even on an information science course recruited entirely from science graduates one can find students without any previous contact with computers. In any course the first requirement is to get students over the threshold of fear of computers (if this has not already been achieved at the undergraduate level).

There have been several attempts to devise packages to teach some form of automation. One of the most lavishly funded was the LEEP scheme at Syracuse University financed with over $100,000 of USOE money. Jesse Shera[6] criticized it as 'getting the technological cart before the pedagogic horse', and called it a 'giant LEEP for Syracuse University but a small step for librarianship'. As the package was based on an IBM 360 machine and MARC tapes it is of limited application in this country. Unfortunately many other good text handling packages are only available on IBM machines. I have found their TRIAL package useful for teaching KWIC indexing and 'hands-on' computer experience, it is also much better than the CDC KWIC package which we have had to use for the past two years at the City University. Next year we will, however, be using an ICL version of ASSASSIN to give our students experience of automatic indexing. We have now got most of the package converted and are carrying out a comparative evaluation of the ICL and IBM versions. ASSASSIN will provide for us a very useful finale to a lengthy group project in which students produce an abstracts journal which is indexed manually, and then mechanically. ASSASSIN will further enable students to make SDI and retrospective searches on collections of such abstracts. On the library housekeeping side, Southampton University in collaboration with PNL is currently developing a package with a BLRD grant.

In a related field there is, of course, the well known Lancaster University Management Game package.[7] Several people have adopted the systems approach to curriculum design in this field; one of the best European courses of this type appears to be Samuelson's highly computer oriented course in Stockholm.[8]

Characteristics of students

Several years ago chemists were the largest group of applicants for places on our courses; in the last two years, graduates in the life sciences have become by far the dominant group. Last year we even had more applications from mathematicians than chemists. This is doubtless reflecting trends in undergraduate recruitment patterns and present job prospects. One sad feature is that we get a number of applications from graduates with difficult-to-market subject combinations, such as botany plus geology, who see an M Sc in information science as a way of getting a much more marketable qualification.

There has also been a continuing increase in the quality of the applicants, possibly reflecting an increase in the status of information science in the eyes of university careers advisers and others. Whilst this is very gratifying to academics, its importance to employers is less clear. Dr Yates-Mercer[9] has tried to correlate the classification of the first degree of more than 150 of our students with their performance on the course. She found that those with a II_2 often performed better than those with a II_1 degree. What this probably means is that many of the lower second graduates whom we recruited got this class of degree not through lack of ability but rather because their degree subject turned out to be quite different from what they thought it would be at school, and were rather turned off by it. For a number of years I taught chemistry, and each year two or three final year students would come and ask me where was the door marked exit from chemistry, as they did not wish to follow the typical chemistry graduate's career.

The majority of graduates in information science obtain their qualifications as postgraduates. A few, however, take Bachelor's degrees in which little more information science is taught than in the one-year post-graduate courses, the rest of the timetable being filled in with a bit of science or foreign language or computing, etc., all taught at a relatively elementary level so that the student's capabilities are not ever extended as they would be in an honours degree in science, etc., which is the normal prerequisite for an M Sc in information science. I therefore believe that students seeking a career in special libraries or information science would be well advised to read for an honours degree in an appropriate subject, and then take a one-year postgraduate course. Bachelor's degree courses in librarianship and information science do, of course, have a 'bird-in-the-hand' appeal for students, in view of the certainty of getting a grant for an undergraduate course, compared with the uncertainty of getting even a place let alone a grant for a postgraduate course (especially if one has an arts degree).

In America, particularly during the great librarian famine of the 'sixties, it was quite common for married women who had got their families off their hands to 'retread' a fifteen- to thirty-year-old BS by taking an MLS as they then had infinitely better prospects of getting a job. We have recently received one or two similar enquiries, in this case seemingly catalysed by the Professional & Executive Register of the Department of Employment. For graduates in the 30 to 50 age group, the Department of Employment's Training Opportunities Scheme (TOPS) can provide a grant to take a postgraduate course, which will enable them to change their field of employment. It seems likely that between 10 per cent and 20 per cent of those obtaining postgraduate qualifications in library or information science in the next few years will be financed in this way. Unfortunately it appears that those who are already in information work, but unqualified are not eligible for a TOPS award for a course in the same field.

Staffing courses

As information science is still one of the few areas in higher education where growth rates are positive and not negative, there will continue to be some demand for teachers. There is, however, a great shortage of well qualified experienced information scientists willing to take up full time teaching posts (at least in the London area). In North America there is frequent interchange between teaching and practice by librarians and information scientists, which is highly beneficial to both spheres. In this country the few transfers that do occur seem to be mainly irreversible processes. This is unfortunate since a teacher's practical experience can wear quite thin and become out-dated with the passing years. If, however, he is active in research and/or consultancy, his academic senescence can be avoided. An alternative would be a programme of extended visits to libraries and industrial information centres or preferably secondment for six months or more. Desirable as secondment may be, it is very doubtful whether it would be possible to find an organization which could justify a senior library school teacher's salary on economic grounds for relatively short term periods. Perhaps the British Library could find funds to subsidize employers and induce them to help lecturers update their experience; alternatively an exchange scheme could be introduced. The SCONUL scheme already does a good job for many students, an equivalent scheme for their teachers is long overdue, but for this to be really effective it would need to be greatly widened to bring in a large number of industrial libraries.

Language requirements

Until we revised our curriculum to introduce the options described above, we included a compulsory course in German. The options made still more demands for time in an already overcrowded syllabus. It has never seemed logical to me to spend a considerable amount of time formally teaching 'O' level material on a postgraduate course and we therefore dropped teaching German on the course (although arrangements were made for those students who wished to take a German course elsewhere). We still include Cyrillic transliteration and give students a hand-out on bibliographically useful words in German and Russian.

The decision to stop teaching German did not appear to be very popular with certain founder members of the Institute of Information Scientists, but I still believe that we should encourage students to acquire foreign language ability before taking a postgraduate course, or immediately after it, rather than on such a course. By the same token, we do not aim to teach a programming language to the standard required of programmers, but merely sufficient for those who have not already had programming courses to handle more readily the various program packages available, such as ASSASSIN.

Information scientists carry out a wide variety of tasks ranging from translating and abstracting foreign language material to setting up large scale computerized systems, but no one carries out every such task. Because English is now such a dominant language in the communication of all types of technical information, once one has learnt English, learning another language will at most increase one's access to information by perhaps a quarter. Thereafter learning more languages is very much subject to the 'law of diminishing returns'.

It therefore seems rather illogical to insist on proficiency in a foreign language or even a programming language as a prerequisite for entrance to a postgraduate course in information science. In practice we have found that less than 10 per cent of the past two or three years' applicants for places on the M Sc course did not claim a knowledge of at least one foreign language. In general they were among the weaker candidates on other grounds and none were admitted to the course.

Attitudes to language proficiency are, however, changing. On behalf of the Institute's Education Committee, we carried out last summer a survey on a 10 per cent random sample of the Institute's UK membership about their views on language requirements for information scientists.[10] It was noticed that knowledge of foreign languages did not vary with age group with half the sample considering that they were competent in three or more foreign languages. In contrast, just over 70 per cent claimed to have no knowledge of computer languages at all, with that figure rising to virtually 100 per cent among the over

40s. The respondents were asked whether an information scientist who had no knowledge of foreign languages but who could cope with at least one computer language could practise effectively as an information scientist. Only one fifth thought that one either definitely or probably could not, whilst just over half thought that one probably or definitely could practise effectively knowing a computer language and no foreign languages. When the question was asked the other way round, 90 per cent of the respondents thought that someone who knew a foreign language but no computer languages could either probably or definitely practise information science effectively.

Other questions asked when was the last time that the respondent needed to use either a foreign language or computer language of which he had an inadequate knowledge. The answers indicated that this was a relatively rare occurrence. It would therefore seem that most respondents are in posts appropriate to their language capabilities. It is interesting to note that a question set in this year's M Sc examination asked candidates to write a speech either for or against the motion in a serious debate that 'This House believes that a working knowledge of one or more computer languages is more important to the average information scientist than a working knowledge of a foreign language' produced from those who attempted the question 5 FOR and 10 AGAINST.

In conclusion, may I remind you that there are many different definitions of information science, a number of which tend to be quite local in application; it is therefore not surprising that there are several different views on how best to train information scientists. What I have presented in this paper is, of course very much a personal viewpoint but fortunately it does not seem to be too far removed from that of most of our graduates' potential employers, from whom we obtain much very valuable feedback.

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DISCUSSION

MR R. HINDSON (British Steel Corporation) asked the purpose of giving information scientists a smattering of computer programming languages.

DR BOTTLE replied that it was to enable them to communicate with programmers and handle packages.

MISS A. M. ALLOTT (Sheffield City Libraries) commented as Chairman, Library Association, Reference, Special and Information section Working Party on Business Information, that the members of the Working Party were very pleased to have the opportunity to meet Mrs Rennie (City University) and to discuss with her the syllabus for the course on Business, Financial, Commercial Information being planned by that university. The resulting discussion was useful and informative. The Working Party was watching with interest the development of such courses and would welcome further feedback on them.

DR BOTTLE replied that the meeting mentioned above was valuable, and that feedback would be made available.

The changing school library service

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**Paper presented at the 49th Aslib Annual Conference, Van Mildert College, Durham, 22nd–25th September 1975*

HIGHER EDUCATION, GOVERNMENT, international agencies, technology and science—these have been the content of papers so far. But the need for information extends downwards as well as upwards and I want now to step down the ladder as it were and look at what is taking place in schools, primary, secondary and middle. Or to be more specific to examine some changes in school librarianship and in particular what is happening in the resource-providing agencies which have grown up to meet the ever widening demands for recorded information in teaching and learning. These demands are now as much visual as verbal and it is reasonable to expect that the present generation of students will begin to look for the multi media provision they have grown accustomed to at school to be reflected in their local public library or through the organization for which they work.

It is in the school library service of a number of local authorities that these changes are most readily observed. I have set out to show through a sequence of colour slides some of the developments in this area of the Wiltshire Library and Museum Service. In the English counties such services grew up as a result of libraries being organized as part of the education service and not as separate departments of the Authority with their own Committee as in urban areas. Since the new Libraries Act of 1964 some services have separated from Education, as in Wiltshire, but the close link with that service survived and in fact was strengthened. The School Library Service is operated on an agency basis and offers a support learning resource service complementing and supporting the library in each individual school. This development took place gradually in response to teachers' needs: committees, working parties and reports were not yet thought of. When these did come in such shapes as the Department of Education and Science's 'The Public Library Service: reorganisation and after' (DES 1973) 'A Language for life' (the Bullock Report, 1975) with substantial and specific references to services for schools the blessing was no less worth having for being retrospective.

I will leave much unsaid, deliberately. You did not come to Durham to hear what can be more readily assimilated from the publications of the Schools Council, the School Library Association and similar bodies. The essence of

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* Mr Wood's paper was essentially a discussion of a sequence of colour slides, which were unfortunately not suitable for reproduction in *Aslib Proceedings*.

Aslib Proceedings, 28 (1), January 1976, p. 30–35. Printed in Great Britain

change in the provision of information to schools is largely the switch from an almost total literacy and aural method of communication to a partnership of words and visual images, one supporting the other, and so it seemed to me appropriate that I should use this combination in my session. My aim then is to give, literally, an overall picture, using illustrations from my own authority, of the direction I think change is taking.

This first slide shows the back cover of an issue of *The Marvel* of 1907. 'It's not hard for boys to get on' says the advertisement, an approach to individualized learning of which Samuel Smiles would have wholeheartedly approved. Seventy years later this still holds but is only capable of achievement if appropriate information carrying materials are readily available in sufficient quality and variety, both within the school and from outside agencies. It is awareness of these needs that has given rise to the changed role of school library services in the last decade or so.

Here is a picture of the schools resource centre in Trowbridge. Those of you knowledgeable on industrial architecture will recognize it as a former mattress factory. Here teachers can compare and evaluate items before acquiring and using them in their schools and material can be borrowed either as single items or in subject collections. Similar centres have been provided in Salisbury and Swindon following local government reorganization and give teachers the opportunity of plugging in to the system locally.

Several speakers have referred to the need for information services to be outgoing. Here a mobile library parked for half a day each term or so in each school playground serves as a shop window for the service, giving teachers unable to travel an opportunity to see something of the range of facilities at first hand. And this poster 'My goodness. My resources!' with its telephone number will, we hope, be more effective than pamphlet guides which have to be picked up and opened to be used. These latter look so respectable that they inevitably join forces with collected readings for assembly on the shelves of the ubiquitous glass fronted bookcases in head-teachers' rooms.

Much of what I show to you will demonstrate the variety of formats now available. Here, however, two children share a book and the bulk of provision through School Library Services will, I expect, continue to be in this form. Convenient, easily browsed and the information within it readily retrieved, the book is unlikely to be superseded and when, as here, it is joined by other formats, an enrichment takes place which would not have been possible if these media were used separately.

The slides which follow indicate the range of both print and non-print carriers of information and ideas which are available to teachers in Wiltshire. Here is *Picture Post* of 8 October 1938, one of a large collection of serials and part publications which have a special appeal to the book resistant child and which can be such a stimulus to reading if used purposefully. Wallcharts have a similar appeal provided they are well designed and avoid the temptation to convey a quantity of information better suited to a thirty-page pamphlet. This item from Greece is unforgettable to all but the most insensitive to design and colour. Here an aerial photograph of Old Sarum conveys archaeological infor mation in a very immediate fashion and such presentations come even more alive when allied to maps. Antique maps such as this nautical chart of the Solent are available along with contemporary cartographical material. And those Ordnance Survey maps of ten, twenty years ago should be retained for the valuable opportunities for comparison they provide. This slide of a letter from a garage in the early days of motoring shows the kind of information that can be obtained from talking to colleagues in record offices. It was found very useful by pupils working on the history of advertising as was this old postcard of advice painted on the gable end of a building in Chippenham High Street. Ephemera has an immediate appeal and its neglect by libraries in the past is unfortunate. Here is a BOAC flight map and a Great Western Railway luggage label with 'Seamans baggage. Culham to Portsmouth and Southsea S.R. via Basingstoke'. An imaginative teacher could use these and similar items as the starting points for a variety of themes.

So much for print. This slide showing an Argo recording of the poems of Edward Thomas could well lead to a more active interest in the books at 821. Quite young children use the new media without difficulty—this slide pack from the British Museum opens like a book, has an attractive cover and is supplied with brief notes. Sometimes the real thing provides the information as with this flag of Kenya. The jargonists call it 'realia'. Note the classification number serving as a laundry mark. When the real thing is not available, a model may be a good alternative, the dairy maid on this slide being a good example of this area of stock. The advantage here is that a group of pupils can work from the same source simultaneously. When items of this kind are to be had from another agency, co-operation avoids duplication and often specialist knowledge and expertise are tapped at the same time. This kit from the John Judkyn Memorial at Freshford near Bath is from a fine collection of Americana which can be borrowed from that source. If, as I believe, a library is a place where information and ideas are selected, collected, organized and retrieved in order that they may be exploited and used irrespective of physical form then all this material is by definition appropriate library stock. We will accession anything useful in a teaching or learning situation which does not need feeding and which does not take more than two people to move it.

I now want to show the interaction which takes place when a variety of formats on a single theme are brought together and take as my example a secondary school history group studying the First World War. The slides which now follow show some of the items lent to the school from the Wiltshire School Library Service: there is only time to show a sampling and in practice a much larger collection than seen here would be prepared.

There are, of course, books with an emphasis in source material of which *Letters from the front 1914–18* compiled by John Laffin (Dent) is a good example. Imaginative literature has an important role in setting atmosphere and for this reason titles such as *Tank Commander* by Ronald Welch, a Carnegie Medal winning children's author, would be included. And here is 'Trowbridge roll of honour' able to answer such questions as 'Did anyone living in my house serve?' And if so 'Where?' and 'Did they come back?' Equally immediate is this facsimile of a contemporary newspaper and the *Observer* colour supplement of 8th July 1973 containing a description of early tank warfare which would be included following a check of the information index. Postcards would be represented by this view of the bombardment of the cloth hall at Ypres and this field postcard sent from the front to a soldier's home in Melksham and which is surely the great-grandfather of the public library multiple reply form. The teacher may wish to look closely at propaganda using Maurice Rickard's *Posters of the First World War* (Evelyn, Adams and Mackay 1968) with its perceptive introduction, and perhaps this full size colour reproduction of 'Daddy what did YOU do in the Great War?' which we obtained from the Imperial War Museum. Governmental control of information is seen on this cigarette card from Wills' 'Military motors' which was 'passed for publication by the Press Bureau 30/11/16'. And as a final example the Argo gramophone record 'What passing bell' with its readings of the thoughts and outlooks of people as diverse as Haig and Siegfried Sassoon. I suggest that a collection of this kind will give the period an immediacy which could not be achieved through books alone.

One area of knowledge which has always presented problems to the librarian serving schools is that of local history. Visual material, in colour and of a high standard, is rarely available from commercial sources. This has given rise to a new activity for the librarian, that of a creator and initiator of materials. The Kennet and Avon Canal, dividing Wiltshire in an east/west line is of considerable interest to schools as it is in the process of restoration and both teachers and pupils are helping. I indicated the subjects to the photographer whose skill in his art is clearly evident in these slides. I was concerned not only to have the course of the waterway through the landscape recorded but to depict details such as bridges, as with this graceful iron structure near Bath, and buildings like this canal-side brewery. Cast iron notices and the textures of rotting lock beams and lichen covered stonework also received attention. Slides such as these have been used by art and English departments and have a variety of applications in addition to serving as records. These slides are used along with models of narrow boats, locks and perhaps a decorated water can.

The next short sequence of slides shows another exercise of a similar kind, the subject this time being parish church architecture. Many country schools make a study of their local church and again visual information is difficult to obtain. Not every building in the county can be given this treatment but teachers prefer to refer to local examples when possible. Here are interior details: a bas relief, a medieval wall painting and a Royal Arms. This latter subject could additionally be the starting point for a study of heraldry or perhaps in the secondary school the relationship between church and state. And here, in this lithograph by John Piper from the framed picture collection, a distinguished contemporary artist views the same church and adds yet another dimension rather analogous to the item of imaginary literature in the World War I collection.

Another kind of library-created material is represented in this slide of a portfolio on the drug problem. Different because this time the work was done by a secondary school and is an example of the user feeding information into the central organization so that others can benefit. In the slide can be seen cards carrying mounted news clippings from different sources and putting forward varying points of view published on the same date. Comparison is achieved by mounting them side by side. To provide supporting background information the library has added appropriate pamphlets. Other themes tackled in this way by this school include the rebuilding of the SS 'Great Britain' at Bristol, the controversy over the siting of London's third airport and the Northern Ireland problem.

In these various ways the library service has become an initiator, a creator of materials to be used alongside those available from commercial sources. None of this information is structured: the library as it were provides the raw material leaving the teacher to interpret and introduce it in his own individual way according to the needs of his pupils. Sometimes a teacher visiting one of the resource libraries will come across an item, a model perhaps, or photographs in a book or a poster which will be his starting point, the germ of an idea for next term's theme or the extension in a new direction of something already undertaken. This catalyst role is increasing and is a very rewarding one to observe.

How this stock is selected, stored and retrieved is not for today but I show this slide of material on a shelf in the School Library Service at Headquarters because it indicates how a change in approach has stimulated use. In the early days we stored different formats separately as though there might be something not quite decent in allowing them close proximity. This meant that uninitiated users and hard pressed staff overlooked interesting possibilities when checking the shelves. I should explain that for the bulk of the stock there is no catalogue, retrieval of material not readily located through the classification scheme being traced through an extensive information index. This system of separate shelving was changed as a result of discovering this copy of Greenwood's 'Map of the County of Wilts', an original dated 1819. As you see in the first slide, it is neatly packaged and disguised as a book but when taken down and opened out as here it becomes a wall chart. So we reverted to the early-nineteenth-century mode of storing visual materials and integrated, as far as possible, all our stock in one sequence with the result shown in these slides of the 630 agriculture section. Of course, all things are not possible: the models are separate, tapes are not found on metal shelves and wall charts, for the most part, are in umbrella tubs. But the box containing the flag of Belgium is next to the slide folder of Brussels which is next to the Blue Guide and our experience has been that this approach has brought about increased use and, more important, a new attitude which thinks primarily of subject and content with format and container receiving secondary consideration.

And if any further reminder is needed that dealing with these varied materials is only continuing past practice, look at this slide of a kit showing the processes through which wood pulp passes before it becomes a newspaper. This was in use in a village school near Salisbury in 1905. Seventy years later the Textile Council produced this similar kit 'Britain's cottons: samples of cotton from field to fabric'. Perhaps information or the world are not as changing as the title of this conference suggests.

Finally, what of the personnel in a situation of this kind? This slide shows Wiltshire's conservation officer, responsible for examining, cleaning, treating, stabilizing, reconstructing, conserving all manner of things from the past, from pots to petrol pumps. So we now have other backgrounds than librarianship:

art and design, archaeology, teaching, technical expertise in the conservation of artefacts and in the handling of audio-visual equipment. I like Dr Enright's summing up of the situation in his book *New media and the library in education* (Clive Bingley 1972) where he says 'There are grounds for considering that the arrival of new media, far from being a threat or an irritant to libraries, provides them with an outstanding opportunity to serve their users, to redefine their functions in the modern world, to reconcile print and non-print, and to reach a recognised and rational basis for future provision of services from finite resources towards meeting well-nigh infinite needs'.

In the life cycle of change attitudes come first, the rest following almost inevitably.

DISCUSSION

MR V. T. H. PARRY (Royal Botanic Gardens, Kew) thanked Mr Wood for one of the most fascinating and thought provoking lectures given at an Aslib Conference for a number of years. He asked whether Wiltshire was far ahead of everyone else in this field, or whether this kind of development was taking place in a large number of public library authorities?

MR WOOD replied that there was very little similar work in urban authorities, but about six to eight counties were developing similar schemes, including Leicester, Surrey and Somerset.

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Letters to the Editor

Sir,

LIBRARY-BASED INFORMATION SERVICES IN HIGHER EDUCATION

GERRY SMITH'S RECENT EXPERIENCE of information services in higher education is more direct and recent than mine, but I would like to make some comments on his paper in the June *Aslib Proceedings* (27 (6), 1975, p. 239–46).

1. Courses for undergraduates in literature searching techniques are rarely well patronized, or useful, unless they form an integral part of the student's academic course. Isolated library instruction courses are often not seen to be relevant, and their actual relevance to students is often marginal.
2. Since very few good mechanized services in the social sciences and humanities are yet available, either researchers in these fields serve themselves (which, in the social sciences at least, most of them do not do well), or they are not served, unless the library serves them. Why should they be deprived of services available to their scientific colleagues? A personal manual service in subjects where the literature is not yet overwhelmingly large costs much the same as a computer profile in science.
3. In any case, computerized services usually need, for optimum profiling and use, some help from persons fully acquainted with the range and nature of the services. In industry such services are often channelled through the library/information unit, and are often also supplemented by manual services provided by the library.
4. If the library is not to offer such services, there is a good chance that they will be attempted, not by the academics themselves, but by research assistants who are likely to spend far more effort to much less effect than the library staff.
5. Gerry Smith says it is 'far from proven' that 'academics are under increasing time pressures'. But the staff: student ratio has worsened, and may worsen further. Since students have to be taught, and will hardly need less teaching than before, it is probable that the staff will have less time for research. If good literature searching takes library staff a long time, it takes the average academic much longer. It will be done even more sketchily than before if the academic is to have much time at all left for research. Of course he may cease to do research at all, in which case an information service can be directed solely to his teaching needs—this is different, but may be no less demanding. Or he may work longer hours—if the published figures of weekly hours worked by academics are even approximately accurate, this seems unlikely, however 'generous' the sums of money they are paid. Many library staff are paid similar generous sums of money, to provide adequate library services.
6. Bulletins are fine, but cannot meet the individual needs of all academics with full effectiveness. Anyway, if such bulletins have to be compiled in-house,

virtually all the information required for individual service has to be collected anyway. And is there not a lot of wasted duplication of effort if all libraries compile their own bulletins?

7. Reference searching is surely a lot less boring than most library work. It is true that much of it is clerical, but this can be delegated to lower level staff, leaving 'academic' library staff to direct, check and supervise the work. A personal service requires regular contact with academics and involvement in their activities; it is concerned with people who have definite needs, and is geared directly to serving those needs. Of how many areas of library activity can this be said? In my view, it is a highly satisfying part of library work.
8. As for 'spoon feeding', I don't consider myself 'spoon fed' if I travel by train rather than drive long distances. Even for short distances I may often prefer to take a taxi.
9. 'Information services *should* come after collection development and organization in library priorities.' This is a value judgment, with which I do not agree. I believe that academic libraries exist to serve members of the academic community with information. Most information is at present recorded in the form of print, and this is why libraries collect books. But books are a means to an end, and the means are already showing signs of changing.
10. If the cost of information services is considerable, at least their effectiveness is direct. If it costs £100, say, to serve a researcher personally, this is no more than the cost of cataloguing 50 books in most academic libraries, and the direct effectiveness of cataloguing and classification as commonly practised is not easy to demonstrate. In any case, literature searching, retrospective and current, is not an alternative to other library services or other forms of information service. They are complementary and need not be in competition if routine library operations are rationalized and drastically simplified.
11. 'Library users regard libraries first and foremost as organized document collections. To ignore this fact of life is a positive disservice.' That they regard them as such is because they have rarely had much alternative. I have personally found many users welcome a different sort of library from that traditionally provided. It is an even less mutable fact of life that library users neither enjoy, nor perform very well, literature searching.
12. Ultimately, the issue boils down to two questions: (i) is it necessary for library users to have regular access to a wide range of relevant literature in their field? If so (ii) how can this access best be provided? By academics who are 'trained' to search for themselves, and even if they are willing to be 'trained' rarely search very efficiently? Or by information specialists who, earning less than the average academic (the average salary of the academic being inflated by the high ratio of professors, readers and senior lecturers), can probably do a better job in less time? And if information specialists are desirable, is the library, which holds the reference materials that have to be searched, and can provide or obtain the documents required, not the best place for them?

Gerry Smith's experience at the City University (in a branch library, incidentally) has evidently not been a very happy one. In the article immediately following in the same issue of *Aslib Proceedings*, we read of a different and more favourable experience at the University of Aston. Experience in offering services should be pooled, and the factors that favour development of such services or otherwise need to be identified. But it is also true that in a relatively new field like this, much more experience is needed before firm guidelines for the future can be laid down.

Yours faithfully,
M. B. LINE
British Library Lending Division,
Boston Spa

Sir,

NATIONAL LENDING LIBRARY

I refer to Dr Urquhart's revealing paper on the National Lending Library (NLL) (*Aslib Proceedings*, June 1975, p. 230–8).

It is interesting to have the speaker's reaction to the Library Association Meeting in 1957 outlining his then plans for the proposed new Library. It is not my recollection that 'pandemonium' broke out after his speech and the silence which followed. Viewed from the back, it was apparent that by that time half the top brass of the Library world had long departed because they saw no reason for an empire to rival their own. It was only afterwards, when as Dr Urquhart now ingenuously confesses to an Aslib audience, he had decided on 'a change of emphasis in my professional activities from Aslib to the Library Association' (p. 233) that the Library brass began to fawn on him. One had always suspected that the Executive arm of Government worked as Dr Urquhart described, switching allegiance as best suited it, but it is refreshing to see it described so openly. The Aslib members, then representing the most vitally needed form of Library and information work, namely that in industry and in industrial and scientific research, were left in the lurch and never consulted. And, as usual, the Aslib Council did nothing. The Library (NLL) which was eventually to decimate the industrial membership forged ahead with no proper discussion of the effect it would have and was having on their role and even existence. Naturally, as employers discovered that there was a much better endowed 'National' Library for Science Lending they viewed it as a cheaper alternative to their own Library, especially since they were forced to pay for the national institution anyway.

Thus, the most progressive and active field of Library and technical information work was effectively destroyed, as many of us know to our cost.

Even worse, because of the unorganized network of postal and telephone requests for borrowing which had grown up among and around industrial and scientific Libraries in those days, a quite effective 'invisible College' of Information had developed. As well as a pretty good idea of who had what, we also had a good idea of what subject enquiries they could best handle. But 'unorganized networks' do not fit happily into the development plans of the Organization men and the Executive. So without any voice being raised in Aslib or elsewhere, this unofficial network was destroyed. Those of us who wrote to Dr Urquhart in 1957 pointing out some of the dangers never got a reply. The fact that non-current journals could afterwards be borrowed more easily from one source rather than several did not compensate for this loss, which in its own small way contributes to our current poor scientific and industrial showing and the current —perennial?—economic crisis.

I suggest that had the Aslib Council and officers been a little more interested in the industrial membership which has had to supply the bulk of their funds, the valuable contact with Dr Urquhart could have been retained and some of the more unfortunate consequences of the NLL avoided.

It is interesting also that Dr Urquhart makes some strictures on the theoretical researches financed by the then OSTI. One or two of us in Aslib made ourselves extremely unpopular at that time by saying much the same thing, particularly in relation to Aslib research and particularly in relation to its financing by the former OSTI, under terms which did, and apparently still do, place a disproportionate burden on the membership—and on a membership which has suffered a significant decline in numbers over the last few years.

There was a great opportunity for the then National Scientific Library to work hand-in-hand with the scientific, technical and industrial Libraries. Regrettably, Dr Urquhart preferred to concentrate his consultations on a Library field dominated by public and academic librarians having little or no knowledge of, or sympathy with, the problems involved in and the effects on smaller—and, therefore, in the view of most of them, insignificant—libraries. The full consequences of this decision are only beginning to be seen now when the National Lending Library, too, has been swallowed up in a general Lending Division—a mistake which Dr Urquhart himself precipitated by extending into non-scientific fields, and also by such digressions as diverting part of his Library effort into taking up an unnecessary middleman role in 'Medlars' enquiries, a function which did not concern a Lending Library in any way.

The destruction or restriction of a considerable part of the pre-existing but unplanned—and all the better for it?—scientific Library and information network by the unilateral action of the NLL helps to account, in its own limited area, for part of the poor scientific and industrial performance of the last twenty or more years, and which, in turn, partly accounts for the worsening economic crisis. Having seen the NLL, in turn, swallowed by the British Museum Library, under new name and management, Dr Urquhart may now appreciate something of the magnitude of his error. It is up to us to ensure that similar mistakes are not made by its successor, the British Library.

Yours faithfully,

R. MOSS

Saltburn, Cleveland

Comment by Dr Urquhart

I find Mr Moss's approach to the NLL's history most refreshing. When I was being attacked by librarians that was a form of 'fawning'. When many special libraries transferred their back runs of little-used periodicals to the NLL that happened because I failed 'to work hand in hand with the scientific, technical and industrial libraries'. According to Mr Moss the NLL helped to destroy the 'pre-existing scientific library and information network' and this has been partly 'responsible for the worsening economic crisis' and apparently while the Aslib council were asleep the NLL was able to 'decimate the (association's) industrial membership'. But need I do more than congratulate Mr Moss on including so many misconceptions in a single letter?

Comment by Mr Maurice Line, Director General, BLLD
Every reader can compile his own list of errors and misunderstandings in Mr Moss's letter. I will only suggest that his reference to the NLL 'being swallowed up by the British Museum Library' is a rather distorted account of the creation of the British Library, and mention that the lending system developed as a result of all the gross mistakes recounted by Mr Moss is the envy of most other countries and a possible model for some. Hands up all librarians who want to go back to pre-NLL days!

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BRIEF REVIEWS

BATTELLE COLUMBUS LABORATORIES. Energy information resources: an inventory of energy research and development information resources in the continental United States, Hawaii and Alaska. *Compiled by* Patricia L. Brown, Clarence C. Chaffee, Robert S. Kohn and Joseph B. Miller. *Sponsored by* Office of Science Information Service, National Science Foundation. American Society for Information Science, Washington, D.C., 1975. vi, 207 pp. $14.80 ASTS members and libraries; $18.50 non-members (ISBN 0 87715 111 3).

The objective of this publication is to provide scientists, engineers and others concerned with research and development related to energy with a reference to potentially applicable sources of information within the US. Very few of these information resources are dedicated solely to energy; most of them deal with subjects or missions with energy-related components.

The first guideline for including an information resource in this book was that the resource must contain information oriented towards R & D—resources concerned primarily with energy policy, economics, supply, demand, consumption, imports/exports, allocation, rationing, etc., were excluded. The resources were also expected to contain energy-related information substantially useful to a researcher; and to be generally available to users.

The inventory consists of three main sections:

(1) Information resources	193 entries arranged alphabetically
(2) Annotated publications	Selected publications provided by the information resources, arranged alphabetically by title. 108 entries
(3) Indexes, viz. Organizations Acronyms Geographical (by state, then city) Serial Products Subject	

This book should obviously be useful to the numerous people working in the energy field. But what a pity that its date of compilation—June to October 1974—is a few months too soon to take account of the very important changes which took place in January 1975, *i.e.* the setting up of the Energy Research and Development Agency and the dismantling of the USAEC.

C. W. J. WILSON,
AERE Harwell

FID. FID Publications: an 80 year bibliography, 1895–1975. The Hague, FID 1975. 94 pp. Dutch guilders 20.– (ISBN 92 66 00531 2)

The present bibliography is an extension of the cumulated list (up to publication 280) which appeared in the *Guide de la Fédération Internationale de Documentation* (FID 267, 1955) and *75 years of FID Publications. A bibliography, 1895–1970* (up to publication 471) issued by the FID Secretariat in 1970 (FID 469). The bibliography lists the 535 titles registered between 1895 and 1975. The total number of publications, however, is far larger because of journals, series and other works in several volumes, reprints or revised editions, all bearing the same publication number. Headings marking 5-year periods have been added, and, for the first time, a selected list of unnumbered FID publications has been added. There are subject and author indexes, and an index to publications prepared under the auspices of FID Committees.

GROVE, P. S. *ed.* Non-print media in academic libraries. Chicago, ALA, 1975. 239 pp. *ACRL publications in librarianship, no. 34.* (ISBN 0 8389 0153 0)

This book is presented as a guide for administrators, students, librarians and specialists responsible for developing, organizing or servicing audio-visual collections. Chapters are as follows: Bibliographic organization of nonprint media, by Pearce S. Grove; Selection and acquisition, by Robert N. Broadus; Standards, by Evelyn G. Clement; Sound recordings, by Gerald Gibson; Slides, by Wolfgang M. Freitag and Betty Jo Irvine; Film, by Dwight F. Burlingame and Herbert E. Farmer; Filmstrips, by Dennis Fields and Tony Schulzetenberg; Maps and map collections, by Mary Galneder and Alberta Koerner; Pictures, photographs, and prints by H. Joanne Herrar; Selected references on the acquisition, organization, and dissemination of nonprint media in academic libraries, by Mary B. Cassata. Most of the chapters, from 'Sound Recordings' to 'Pictures' inclusive, contain a historical outline and sections on bibliographic surveys, sources and selection, cataloguing/classifications, staffing/qualifications, and handling and equipment.

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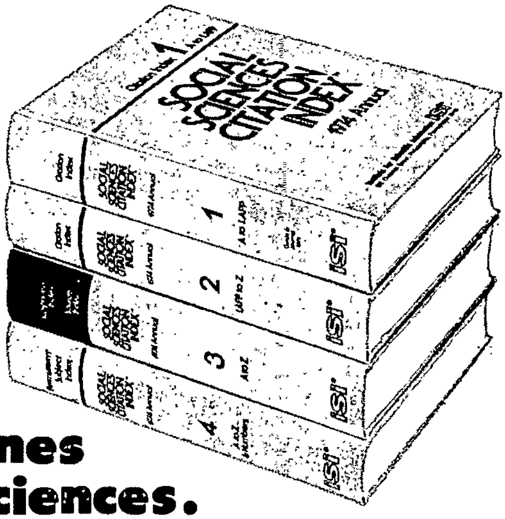

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Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed at the Alden Press, Oxford

ISSN 0001 253

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Aslib Proceedings

VOLUME 28 FEBRUARY 1976 NUMBER 2

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Information and local government

D. Kennington

GLC Intelligence Unit

Paper presented at the 49th Aslib Annual Conference, Van Mildert College, Durham, 22nd–25th September 1975

THE THEME of this conference is information in a changing world. I think I was asked to contribute because, for the last six years or so, I have been fortunate to be placed in a very important sector of this changing world—local government. Both in this country and abroad the changes taking place, particularly in urban areas, have created vast new problems for urban managers and, as a result, they and their professional advisers from a wide range of disciplines are demanding better access to information.

Exactly a year ago, following the Cambridge conference, an Aslib party came to County Hall and heard the Deputy Leader of the GLC say that

> London local government has a pressing need for relevant information. Like all major cities of the world we have our problems and need to know quickly what solutions are being found, no matter where the work is being done. Because of the vast range of information potentially valuable to us, it is necessary for us to maintain a small, but expert, team of information specialists and librarians to monitor the literature and ensure that members and officers are kept fully up to date so that deliberations on policy issues are based on the fullest possible knowledge and understanding . . . we believe that, by having this information well organized and preventing unnecessary and costly duplication, we are not only saving money but also ensuring that, in finding solutions for London's problems, we act not only with wisdom but with knowledge.

You can see from this that our political masters are aware of the problems.

The process of local government reorganization in the UK started with London in 1965 following the recommendations of the Herbert Commission, continued with England and Wales in 1974, and was completed earlier this year when Scotland's new authorities came into being. This factor alone would have been enough to generate a massive information problem as lines of communication within new authorities, between new authorities at different levels (and with different but often overlapping activities), and between new authorities and central government, depend on effective information flow. One thing the Herbert Commission[1] found when investigating London was just how difficult it was to get relevant information on which to base its decisions, and this prompted it to insist on the creation of a special section in London local government with responsibility for seeking out gaps in information provision and filling them. It was this clause in the *London Government Act*[2] which created the Intelligence Unit of the GLC and, although subsequent legislation has been permissive rather than mandatory on this subject, almost every authority is equipping itself to handle the problem. There are many different ways of meeting particular local needs, and there are many different types of people with varied skills involved in some aspect of information flow.

Aslib Proceedings, 28 (2), February 1976, p. 46–55. Printed in Great Britain.

This, I believe, is as it should be, provided that information is properly recognized as a major corporate resource. I will say more of information-handling skills, and the people involved, later in this paper.

Before I get that far, I would like to outline some of the other factors involved in responding to a changing world in local government. With reorganization, in some cases even in advance of it, there has been the move towards corporate management structures and techniques. Now, almost by definition, these systems are information-dependent systems. Community needs are established—to do this information is required; then priorities between these needs are determined, also on the basis of information; methods of tackling the priorities are examined and, in choosing between alternative methods, information is again brought to bear, particularly comparative information (*e.g.* how has Glasgow done it, or Paris, or Singapore?); finally, programmes of work are established to execute these decisions and these require information of the most basic technical type (down to which type of paint do we use to mark out bus lanes) as well as monitoring information designed to report back to the authority on the progress it is making. All these stages include elements of internal management information, research and statistical data, narrative technical information, and information on public reaction and responses. In fact, all information flow is multi-dimensional and the process of ensuring continuous feedback from the 'customer' is quite as important as creating an effective means of communicating information to him.

This brings me nicely to a second factor, that of more open government. Local authorities have, I think, a commendable record in recent years in this field; much better than central government, one might argue. Not that complacency should set in, but one can detect a more professional approach to public relations with the admittance of the press and public to council and committee meetings and increasing efforts to stimulate genuine public participation through better presented consultation documents, meetings and exhibitions. For example, the GLC has held open seminars on the subject of London's canals at which all types of organization were able to air their views. Most authorities have also gone some way towards providing a permanent means of communication with the public in the form of information and advice centres. Some have sensibly capitalized on existing 'plant' and expertise by basing them on the public library service; others have developed a variety of housing advice, legal aid, planning advice and consumer advice services in separate locations. However, they have done it, although whether it has been done in the most cost-effective way is open to discussion; the important thing for this paper is that it has been done and has created considerable information problems. Another aspect of the open government factor is local government co-operation with voluntary or commercial organizations in the provision of certain services. Undoubtedly, pressures from central government, the setting up of a local government ombudsman and the demands of pressure groups have all had an effect here.

Another factor is the 'growth' of government. More and more aspects of life, and its quality, are affected by governmental decisions. A major problem for local authorities is the continual addition to their responsibilities because of

Acts of Parliament, government instructions and even advice which can be very difficult to ignore totally. We have plenty of examples. The Alfred Morris Act on the disabled caused major problems for hard pressed (and, then, very new) Social Services Departments, and we now have the Community Land Bill which could do the same to valuers, surveyors and solicitors. An inevitable product of this expansion in central and local government activity is more information.

Finally, and very topically in the light of the current economic situation, we have financial problems. Whatever the Layfield Committee on local government finance comes up with (and this is a good example of the generation of local government documentation with 1,000 separate submissions of evidence!), there will be continuing demands from the public for greater accountability. Again, aspects of information flow—technical, management and public relations are all involved.

What do these important changes and trends mean for information services in local government?

Well, first, more research is being done to fill those gaps in information provision I mentioned earlier. Research and Intelligence Units, Planning Departments, Social Services Departments and others are collecting and analysing raw information and, inevitably, there is a need to record and disseminate this information in a variety of ways to particular categories of user. The GLC, for example, produces a range of documents which vary in production standards and presentation according to their ultimate 'market'. *Research Memoranda* are interim or final reports on research projects aimed mainly at other researchers or professional officers in the GLC or the London boroughs who can be expected to understand the subject in some depth. On the other hand, our *Facts and Figures* booklets are designed for the non-specialist, the elected member and others who need to appreciate a complex problem without necessarily understanding the methodology of how the information was collected and processed. All local authorities now produce this kind of information—planning studies, recreation studies, Transport Policies and Programmes and so on. Some get consultants to do the work and, again, reports are generated. Sponsored or independent work is also carried out by academic research organizations and central government agencies like the Transport and Road Research Laboratory and the Building Research Establishment.

Then there is that information which exists already, and was perhaps created for some totally different purpose, but which is highly relevant to the local authority in some aspect of its technical or managerial work. For example, trade information, British Standards information from or about industry and commerce and so on.

Statistical information constitutes another major component of the urban literature and my library contains several hundred statistical serials. We are particularly interested in statistics, official or otherwise, at less than national level and our collection of city statistics is probably as good as any in this country.

There is also press and journal information and pressure group literature—indeed, all that area of information which helps to identify how local opinion is developing.

Finally there is the internal documentation of the local authority itself—its minutes and agenda papers, the papers concerned with public enquiries, and a vast amount of other documentation which, if I mentioned it all, would take up the whole of this paper.

This enormous output of information constitutes what used to be called a literature explosion. It is an explosion which, like most, is initially out of control—bibliographic control. A very small scale exercise, I hesitate to call it a survey, which I carried out recently showed that some 60 per cent of the pamphlet and report literature covered by our *Urban Abstracts* bulletin was not included in the *British National Bibliography*. This is not the fault of the British Library; indeed, I was impressed at the number of extremely fugitive items listed. It is created by the strange 'publishing' habits of many organizations in the field. The content of these documents contrasts greatly with the 'hard' information usually found in the scientific and technical literature since it lacks the discipline of scientific writing and publishing and includes a great deal of opinion and political 'case making'.

To give you some concrete examples of the type of literature I have been talking about I have collected together a few of the titles which have appeared on the Research Library's shelves in the past couple of weeks. They illustrate quite well the variety of sources which need to be covered by any successful local government information service.

First there is the research report produced by a local authority, represented by the London Borough of Redbridge Planning Department's *Report of the Ilford Town Centre Shop Servicing Survey*. Of obvious interest to the GLC, one might think, but no more so than the Copenhagen Planning Department's report on *Pedestrian Streets and Other Motor Vehicle Traffic Restraints in Central Copenhagen* which appeared next to it.

The *Third Special Report from the Select Committee on the Abortion Amendment Bill* is an example of the output of central government which has implications for future local government responsibilities, while the Institute of Economic Affairs Occasional Paper *Full Employment at any Price?* represents the documentation produced by independent research organizations and of interest to local government. Another example, the Fabian Society Tract *Why Local Democracy?*, is of direct interest. The university research sector is represented by the University of York's Institute of Social and Economic Research pamphlet on *Hospital Waiting Lists and the Supply and Demand of Inpatient Care.*

The pressure group sector is one which is growing particularly fast and this is reflected in its output of reports, many of which relate directly to local government policies and services. The Shelter Housing Aid Centre report on *Decoration Allowances,* for example, is concerned with one aspect of housing management policies in London. The British Property Federation survey *People and Homes: Landlord and Tenant Relations in England, 1974/75* is another report from an outside organization of particular interest to local government. By coincidence, these two organizations both have relatively sophisticated publishing programmes and their documents are easily acquired; this is anything but the case with some other pressure group literature.

This, then, I hope, gives you the flavour of urban documentation and some of the problems involved in handling it. My colleague, Lesley Grayson, is publishing a paper in next month's *Journal of Librarianship*[3] which tells more of this fascinating area of literature.

The second problem of information services in the field is the emergence of new customer groups. Some are really not all that new—they have been around before, but are new in that they are making demands way beyond anything they have wanted before. Elected members are a good example and many of us have special problems in satisfying their demand for much more extensive and responsive services giving them access to 'alternative' information. By 'alternative' information I mean information which supplements their regular diet of official committee and council papers. Other emerging groups include, for example, research officers, corporate planners and training officers, not to mention the highly specialized individual like the area traffic controller. These latter are physicists and electronic engineers and require services akin to their counterparts in industry with an added ingredient to keep them informed on public reaction to their highly technical schemes and on the corporate strategy of the authority as a whole.

The final influence of the changes I mentioned has a bearing on the financial issues as well as the sheer size of the problem. We are faced, on the one hand, with the literature explosion and rapidly increasing and diversifying demand; on the other, with financial stringency and pressure for economy. As a result, we are having to try new methods and to lift proven, but sometimes unconventional, techniques from our colleagues in better established areas. Our *modus operandi* tends to be that of the industrial special library or the information analysis centre. Comments have been made to me jokingly of the 'English Electric/BAC Mafia'—I will admit that a few of our past and present staff did belong to that once happy industrial band and although, like lizards in tropical climes, we have changed our skins to attune with the County Hall environment, we still do behave very much like industrial librarians. This may surprise those of you from industry and perhaps encourage all of you who are ratepayers, since we have retained a surprising, and very useful, cost consciousness which has helped us to weather many storms.

One final point in this section of the paper would be to emphasize that good information services are no luxury in local government. They are a vital cog in the machinery and should be central to the corporate management process. For that they require a status equivalent to that of any other comparable part of the corporate structure and must be seen to be non-partisan in the widest possible sense.

What, therefore, should information services be looking at given the aforesaid situation of vast and increasing output of information, increasing and diversifying demand, and financial stringency?

The trends already mentioned obviously raise a large number of issues relating to the identification of customer groups, bibliographical control of local government information, etc. Then there is quality control and presentation. First, however, we must improve the quality of information provided to the customer. This implies:

(a) That information officers should be able to make judgments on the quality of the information they see and select the most relevant for the needs of their customers. This requires the information officer not only to have a good knowledge of the bibliographical sources but also to know something about the subjects he is dealing with, to be able to recognize a rehash of old ideas and distinguish it from a new approach. This is not a traditional librarianship approach to information and overlaps considerably with the work of those close colleagues of ours—the researchers in local government. It also has implications for the qualities required of information officers in the local government field and, of course, their status *vis-à-vis* other professions in local government. In addition, it relates strongly to their attitude to, and relationships with, customer groups (of which more later).

(b) Information staff must be able to present information to a variety of customer groups in the most effective way. This implies that they know the absorptive capacities of individual customers; that they have a good appreciation of communication techniques; and are able to reconstitute information in a form which is accurate, concise and understandable, whatever the capability of the customer. This, again, implies that information officers need qualities not always demanded even from librarians working in the special library sector. For example, an ability to write clear and concise English, an appreciation of the value of visual means of communication, and a knowledge of methods of presenting information in a format which ensures that the customer does not consign it to the pending tray or the wastepaper basket. The effective presentation of information may well require information services to take over some of the ideas of public relations or journalism. The information dissemination services produced in local government, even in new areas like members' information services, are all extraordinarily similar—the daily press bulletin, the weekly or monthly abstracts bulletin, etc. This uniformity may not necessarily indicate that these formats are the best possible approach but simply that new ideas have not been tried.

For the elected member, in particular, there is often a need to pre-digest information and repackage it so that he grasps the essentials and knows where to look if further detail is required. Following House of Commons practice to an extent, but gradually evolving our own style, we have produced a series of *London Topics* which present the state-of-the-art as represented by the open literature and the GLC's own documentation and research. They are designed to anticipate important debates on major issues, and subjects covered have included 'Tenant Participation', 'Vandalism on Housing Estates', 'Lead in the Air', 'Cable Television' and about a dozen more. Leicestershire County Library has also done some excellent work in a similar vein, producing papers on 'Devolution' and 'Neighbourhood Councils'. These are time-consuming to produce but do seem to stimulate a very positive reaction from members. Officers, too, including those in the London Boroughs, seem to find them useful.

This kind of service, if it is to be produced successfully, requires the mobilizing of resources in all disciplines so that all relevant information can be brought to bear. Our role as a contact point, referral centre, switching device—call it what you will—enables us to do this and to draw on experts who can provide up-to-date information on their specialities and advice on the interpretation of enquiries.

One lesson we have had no difficulty in learning is that we cannot hope to be totally self-sufficient and many of us draw heavily on other services. Linkage between local authorities as part of a wider regional, national and international scene is important to us. In the GLC, for example, we need to draw upon our opposite numbers in the London Boroughs, in other local authorities at home and abroad, as well as specialized institutes, government departments and the House of Commons. I have already mentioned the inspiration we drew from our Commons colleagues for the *London Topics* series and our relationship with them is especially close and is being developed as our various schemes for more automated services are implemented. So you can see that, even where different services cater for different customers with different local needs, all need to draw on information sources outside their own areas.

Although these internal and external contacts with other sources of information are essential to an efficient information service in local government, little has been done as yet to create any formal co-operative machinery with the development of a corporate information store in mind. The Canadians produced an interesting report a few years ago in which they attempted to relate local, regional, national and special subject centres together in a more formal network.[4] Bearing in mind that many of the information officer's contacts will be personal, particularly where unpublished information is concerned, and not subject to formal networking, there is, nevertheless, potential for the development of information networks at a variety of levels, for example:

(a) Within the authority—opportunities to be developed include co-operative links between departmental information units; the participation of information staff in departmental and inter-departmental working parties on particular research projects; and the development of 'indexes of expertise'. In library authorities, the development of such networks implies a lead role for the public library.

(b) Between authorities—some examples of co-operative effort already exist here. For example, the exchange of research publications; the exchange of secondary sources for cover-to-cover reproduction (as in Birmingham where Birmingham Public Libraries are reproducing *Urban Abstracts* for issue to officers and members of Birmingham District Council), or partial use of material from one authority's bulletins in another's (as in Hammersmith where material from the GLC's *Daily Intelligence Bulletin* and *Urban Abstracts* is included in the Hammersmith bulletin *Spectrum*).

(c) At national level—I have already indicated the importance of an effective system of bibliographical control of local government information. The Department of the Environment, other government departments, and, perhaps, the British Library have important roles to play here.

(d) At international level—the EEC Commission and the OECD are increasingly interested in the possibilities of international networks covering urban information and, if on-line systems and databases become available, there are considerable possibilities for dial-up facilities, tape exchanges and the use of outside COM files. In a rapidly changing world, effective control over the widest possible spectrum of information is important to the success of local government information services and is vital if expensive duplication of effort is to be avoided.

In developing these links at all levels I forsee a much greater use of communications technology and computerized handling of information. In the GLC we have developed our ACOMPLIS (A COMPuterized London Information Service) system which uses ICI's successful ASSASSIN programs.[5] This is now beginning to play a very effective part in the services we provide, enabling us to search a database of 16,000 items, provide SDI facilities for about one hundred users at present, and produce COM indexes to the entire file which can be duplicated cheaply and made available to all service points within the GLC and the London Boroughs. The input will shortly be fed in via a remote job entry terminal which can also be used for sending in searches. It is basically an off-line system which has most of the advantages of an on-line system, but is only a fraction of the cost.

The London Borough of Southwark has done some independent testing of the system by using it for real-life searches and, at the same time, mounting a comparable manual search of the secondary sources. In one case we produced some eighty references, including a considerable number unique to us, while they produced around 200. However, their search took twenty-two man hours; ours took a few seconds of computer time plus the time to prepare the search strategy. So we believe ACOMPLIS will allow us to manipulate large amounts of information for our customers in a most effective way.

Other uses of non-manual techniques in the GLC include the production of computerized KWIC indexes for slide collections and council minutes and the use of microfilming on a substantial scale. About a year ago we experimented with the London Borough of Bromley in a telefacsimile trial which involved transmitting our *Daily Intelligence Bulletin* each morning for reproduction at Bromley. Some eighty officers and members received this current awareness service, often getting it before their GLC counterparts! Leicestershire and Birmingham are using Telex in a similar operation.

Local government, then, has a vital interest in seeing that there is more comprehensive coverage of all available information, published or unpublished, and that there is no unnecessary duplication of effort in research and information processing. By using available technology and by maintaining the attitudes necessary for maximum co-operative effort, we can make sure that individual information services can provide responsive services suitable to the needs of their organizations.

All my comments so far will have convinced you that, in meeting these needs for new approaches to problems, local government information officers require the skills of the special librarian. In addition to some formal qualifications, subject knowledge, familiarity with bibliographical sources, a literate style in presenting information and a reasonable degree of numeracy, the ideal information officer will need:

1. An ability to appreciate the objectives of the organization, even if not agreeing with them, and to understand the part played in the organization by its constituent departments, sections and personalities.
2. An appreciation of the special problems of communication in a large bureaucratic organization—in particular, an ability to 'work the system'.
3. A willingness to meet the customer on his own ground rather than waiting for him to make the first move. This implies an outgoing personality and an ability to deal with all levels of customer from junior planner to departmental head.
4. Good political sense—this does not only apply to information officers working directly with elected members.
5. An ability to work accurately and quickly under pressure.

These are certainly the qualities we look for since our approach is to give these officers maximum freedom to develop a high quality service in their own way to 'their' customers. Our members' information officers, for example, are encouraged to take initiatives in serving members of all parties, at all levels—'working the system' and a sure political touch are absolute essentials to success in this very demanding role. Information officers serving groups of officers such as planners and civil engineers are also encouraged to be outgoing and in a position to anticipate customer demand. Our civil engineering information officer, for example, has developed an abstracts bulletin for her customers by the cheap and simple expedient of utilizing a group profile print-out from the Transport and Road Research Laboratory. Most of the information officers operate some kind of SDI service, many using our specialized Fast Announcement system.

To conclude these remarks on staffing a local government information service I would merely add that these human resources are *the* most important single element in creating a successful service.

Finally, I promised your organizing committee that I would say just a little on the co-operative links being forged in Britain and close by mentioning some international aspects.

There is a standing working party of the Birmingham University Institute of Local Government Studies which provides a useful forum for the exchange of views on developing practice in members' information services. It offers training sessions and is working on guidelines for local authorities setting up services. The Special Interest Group on Local Government Information Services,which was set up following the Library Association's Loughborough Conference, is primarily concerned with officer services although, in my view, the two are very closely linked. Other groups in this country with an interest are the Aslib Transport and Planning Group, which has sponsored some excellent one-day conferences on information sources in social planning and pollution and other topics of interest to local government and, especially in the social welfare field, the Aslib Social Sciences Group.

Throughout the world, big cities and regional and other authorities are equipping themselves to cope with the urban documentation problem. We have established links with our colleagues in North American cities like Washington and Toronto and with major European centres such as Paris and Amsterdam. The Paris Region and ourselves are in regular communication and we do regular information searches for them as required—recent ones have been on bicycles and on the effects of inflation in local government. In return they help us—recently we have asked them to trace literature on the building of council houses for sale. This collaboration led us to the joint sponsoring of an international meeting of experts, and in this project we have been joined by the OECD which is developing its interests in this field. The European Commission, at its recent Documentation Networks Conference in Luxembourg, expressed considerable interest in the creation of urban databases which could join their Euronet system.

Information for local government is a subject of wide concern and of vital importance to all those activities which affect your quality of life and the quality of life of the citizen of Glasgow, Toronto or Istanbul. In other words, a 'growth' area for your business. Your business, like mine, is information and communication and without information of the right kind, presented at the right time and in the most appropriate format, our cities will function less efficiently. We have no really reliable indicator if we fail in this task, unlike those of you in industry whose company may go bankrupt if you fail. As Professor Henry of the Arizona State University Center for Public Affairs says in a recent and illuminating paper in *Information Processing and Management*[6] 'while knowledge was always power, today it is the central and controlling force in society and the pivotal value and indispensable force in public policy formulation'. I believe he is right in this assertion and that effective local government in this changing world depends on the best possible information.

Acknowledgement

The author acknowledges the assistance of Lesley Grayson in the preparation of this paper.

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The views expressed in this paper are personal views and do not necessarily reflect the policy of the Greater London Council.

Consumer advisory services

Michael Tilleard and Gillian Clegg

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Paper presented at the 49th Aslib Annual Conference, Van Mildert College, Durham, 22nd–25th September 1975

1. The development of consumer bodies as sources of consumer information (Michael Tilleard)

ANY HISTORICAL SURVEY of the way in which consumers have organized themselves into associations for their own mutual benefit and protection should really begin with the role played by the consumer co-operative movement. But, as Jeremy Mitchell (former Head of Information at Consumers' Association and now Director of the Consumer Affairs Division at the Office of Fair Trading) has pointed out, the co-operative movement was not really a consumer association at all: 'The fact that the consumer, in a co-operative society, is the formal owner of the means of distribution seems to have little significance in practical terms. By analogy, it can be compared with the consumer's formal ownership of the means of production in a nationalized industry, or the individual shareholder's formal ownership of a joint-stock company.'[1]

The history of the consumer movement that I would like to outline for you is one which has really evolved quite separately from the co-operative movement. It has developed in response to various needs which made it essential that the associations of consumers that were set up had, unlike the co-operative movement, no actual involvement with the activities of the trading community. The economic and social changes which have led large numbers of individuals to adopt what Galbraith has called 'countervailing power',[2] by organizing themselves into associations of consumers of goods and services, are ones which are directly related to changes in the market economy. In particular, technological changes have meant a vast increase in the production and distribution of goods of all kinds. Such goods are assembled using highly sophisticated production techniques and will consist of components and materials whose nature and composition are a complete mystery to the mass of ordinary consumers. Backed by powerful and persuasive marketing and advertising campaigns, the supplier of goods and services has built up a tremendous advantage over the individual purchaser of these goods or user of these services.

As the Molony Committee on Consumer Protection, which reported in 1962, said: 'In truth the producer is dominant and his voice is all powerful. His interests usually prevail over the welfare of consumers.'[3]

Aslib Proceedings, **28** (2), February 1976, p. 56-68. Printed in Great Britain.

Information and advertising

As more and more goods of varying quality and performance become available, so the consumer's existing store of knowledge about the nature of particular commodities becomes less and less useful to him in helping him to make a wise choice when buying. What he needs is information which will at least help to some extent to redress the balance between his knowledge of the goods and that of the combined forces of the manufacturer, advertiser and retailer. The collation and dissemination of this kind of impartial information has been the main function of the consumer organizations which have been established in the last fifty years.

But first, what kinds of sources of information does the ordinary consumer tend normally to rely on which will give him some kind of guidance when making buying decisions. As mentioned, he will build up a certain store of knowledge based on past experience of particular brands. He will rely quite heavily on recommendations of friends or relatives, on information from sales leaflets or simply, as most people do, on discussions with the retailers themselves. But I think it is accepted in our society that the main source of information about goods and services available to the consumer is advertising. The problem, of course, is to what extent the ordinary consumer is able to make the fine distinction between what is factual information in an advertisement and what is propaganda.

In spite of the strengthening of the advertising industry's own voluntary system of control, the Advertising Standards Authority, over the last few years the public image of advertising as a means of conveying basic, factual, information about the nature of goods and services has hardly improved. A survey carried out by National Opinion Polls in 1965 amongst a representative sample of adults in the UK showed that fifty-three per cent of those interviewed thought that advertisements, generally, presented a false picture of the product advertised;[4] a further survey earlier this year reported that fifty-two per cent of respondents disagreed with the statement that most advertisements tell the truth.[5] Nevertheless consumers, particularly in the lower social groups, do continue to rely on advertisements as a primary source of product information, and will continue to do so in the absence of more independent sources. We hope of course that the unbiased information and advice offered by Consumer Advice Centres will act as a counterbalance to the influence of advertising, but it is clear that a further tightening up of controls on the uses—or misuses—of advertising is necessary.

Further moves are afoot in this country for such controls, though we have a long way to go before we can compare with the American system. In the States, for example, the Federal Trade Commission, as a penalty for misleading advertising, forced the producer of a slimming bread called Profile to announce in their commercials on TV that Profile had only seven fewer calories per slice than ordinary bread, and that was only because it was sliced thinner![6]

I do not want to go further into the debate on the need for more factual information as opposed to propaganda in advertising, since Charles Medawar has put the case for more stringent advertising controls very forcibly and very clearly elsewhere.[7] It will be sufficient at this stage to quote the rather contradictory statements put out by the Advertising Association and its own Advertising Standards Authority on what the function of advertising really is. 'The main function of advertising', says the Advertising Association, 'is to give the consumer truthful and valuable information on goods and services offered'. However, a former Chairman of the ASA has said that 'The main purpose and function of advertising . . . (is) . . . to act as a selling tool', and not, as Medawar points out, to provide a public information service. If the industry itself is that confused about its function then it is not surprising that the consumer has little faith in advertisements as sources of information and enlightenment.

Consumer organizations

What kind of organizations have developed to act as representatives of this countervailing power on behalf of consumers?

In 1927 an economist, Stuart Chase, and a mechanical engineer from the American Standards Institution, F. J. Schlink, wrote a best selling book called *Your Money's Worth*. The book explained that the American Government had arranged for the National Bureau of Standards to test goods for the Services and Government Departments, so that they then knew the quality of what they were offered and so could choose the best value for their money. As a result this saved the US Government about $100 million a year. The authors simply posed the question of why the American taxpayer, who ultimately paid for all the work to be done by the NBS, should not also have access to this kind of information and so help him make a substantial saving in his annual income. The US Government, for example, were able to obtain such commodities as maple syrup for half the price paid by other people, because it knew which kind of syrup was best value for money. The authors of course were inundated with letters asking them what really was in the various brands of syrup, as well as for more information on every other type of product from toothpaste to motor cars, from instant coffee to washing machines. The writers said that they could provide this information to the enquirer, but the cost would be a dollar a year. So from their position in the NBS, Chase and Schlink could act like 'gatekeepers' for the consumer, though at this stage the information transfer was really a one-way process. It was not until Consumers' Union, which eventually grew out of Chase and Schlinks' work, became firmly established that manufacturers began to take into account the information from CU's *Consumer Reports* when designing new products. CU now has over two million subscribers and an annual income of $16 million.

The important factor about the origins of Consumers' Union is how it sheds light on what motivates the public to acquire information. The publication of the book *Your Money's Worth* and the public reaction to it certainly bears out what Daphne Grose said in her paper on 'The deprived information user' to this conference two years ago, namely that 'the great mass of the population needs to be told that interesting information is available before it will come and ask anything.'[8]

As with the National Bureau of Standards in the States, one of the first bodies in this country to recognize the need for impartial information on consumer goods was the British Standards Institution. The BSI agreed to formulate standards under the 'Kitemark' scheme which was to replace the Utility specifications which had been abolished. In 1955 the BSI set up the Consumer Advisory Council, which was the first organization to provide a complaints and advisory service, and also to publish the first British comparative testing magazine, called *Shoppers' Guide*. It was hoped that by publishing comparative test reports, the CAC could bring greater pressure to bear on manufacturers to improve their standards for consumer goods. It also acted as a useful information source on consumer affairs generally, as well as campaigning on legislative matters such as the need for reforms in Hire Purchase transactions and the Sale of Goods Act. However, being a part of BSI, which of course is partly financed by industry, some manufacturers began to question whether they could finance a publication, one of whose functions was necessarily to criticize goods produced by these manufacturers. This was one of the reasons which led to *Shoppers' Guide* ceasing publication in 1962.

However, just a few months after the first issue of *Shoppers' Guide* appeared in 1957, a sociologist named Michael Young, with initial help from some economists, a solicitor, a barrister, an engineer and a film director, produced the first issue of what he called *Which?* The first issue dealt with comparative test reports on electric kettles, scouring powders, drip dry shirts, cake mixes, sunglasses, and a summary of a Consumers' Union report on small foreign cars. Not really knowing whether the public actually needed information of this kind, and fearing that the venture would immediately fall foul of the English law of libel, there was considerable doubt as to whether the magazine would survive for long. However membership of the newly-formed Consumers' Association grew at an amazing rate. Several thousand joined in the first month and within two years there were 122,000 subscribers. Today there are over 700,000 members and an annual revenue of around £3½ million.

CA has been, and probably always will be, essentially a publishing organization whose main function is the presentation of comparative test data in response to the information needs of its members. In producing its reports on goods and services CA relies very heavily on information provided by its members, both in order to initiate ideas for projects and to test these ideas out in practice. CA's own information and advisory service, which has a staff of twelve dealing with over 200 letters and telephone calls a day on all kinds of consumer problems and queries, is in itself an essential link in the information chain between members of CA and the research and editorial departments. It also provides much useful information to CA's Consumer Campaign Committee (Secretary, Daphne Grose). The responsibility of the Consumer Campaign Committee includes representation and campaigning on a wide range of consumer topics of public interest, such as safety standards, the strengthening of the consumer consultative machinery in the nationalized industries, and effective representation of the consumer view in the EEC.

Of course the main criticism directed at CA is that the majority of consumers do not read consumer testing magazines like *Which?* (the estimated readership is about three million, thanks mainly to public libraries). That membership is largely confined to the higher socio-economic classes is again confirmed in the recent National Opinion Poll survey referred to above.[9] This showed that of the eight per cent of the total sample of respondents who read *Which?*, twenty-two per cent of these belonged to the highest social class (AB) compared with only one per cent of the lowest social class (DE).

The disadvantaged consumer

I would like to look now therefore at the developments in the movement to provide information and advice to the lower-income and less articulate consumer, which has culminated of course in the establishment of a network of local consumer advice centres and advisory services.

As Peter Goldman, Director of CA, said in 1966: 'It is precisely the educationally underprivileged who are most vulnerable to misinformation, least able to afford expensive mistakes and therefore most in need of independent assessment and guidance.'[10] This view is certainly borne out by an American study of low-income consumers. Caplowitz, in a book entitled *The Poor Pay More* published in 1963, showed that lower-income groups engaged in what he calls 'compensatory consumption'. That is, lower-income groups were just as likely to buy expensive consumer durables as groups with much higher incomes, simply as compensation for their lack of social mobility. Having only a small amount of cash and poor credit rating, they were thus more susceptible to being sold goods of poorer quality, via sales techniques which were more likely to be fraudulent or misleading.

It is interesting to note that the recently-formed National Consumer Council (which held its first conference on 19th–20th September 1975) concerned itself very much with the problems of the underprivileged consumer, both as a purchaser of goods and a user of all types of service, private and public. One project currently under way also deals with the theme 'The poor pay more.' The Chairman of the NCC, Michael Young, would like to see the NCC as a fourth voice—that of the consumer—added to the present triple alliance which has supreme power in this country, namely the unions, business, and government.

The problems of the low-income consumer have certainly not diminished in the last few years. This can be seen, for example, in the difficulties low-income families are now having in paying the recent huge increases in fuel costs. The Child Poverty Action Group announced recently that eight in every ten enquiries they receive are either exclusively or partly concerned with gas and electricity costs. The fact that the pensioner or the low-income family tends to use the most expensive forms of heating, such as one- or two-bar electric fires, probably lies at the root of the problem. But then they are unlikely to read the September 1975 copy of *Which?*, which is devoted largely to fuel costs and savings. Unless there are alternative ways of communicating this information to non-*Which?* readers, then the poor will continue to pay more.

The first body to be set up under Government sponsorship to concern itself with the problems facing *all* consumers was the Consumer Council. Established in 1963, on the recommendation of the Molony Committee which sat from 1959–62, its job was to inform itself about consumer problems, take action to deal with these problems after consultation with others, and to provide advice and guidance to consumers. It was not allowed to handle consumer complaints or carry out comparative testing. In spite of the limitations of its budget of only £240,000 it did carry out some valuable work, including campaigning for the abolition of resale price maintenance, strengthening the Trade Descriptions Act, the introduction of the Teltag labelling scheme (the only really independent source of information for the buyer at the point of sale), and standardization of regulations for safety in electrical goods. It also produced reports on insurance, doorstep selling, inertia selling, mortgage brokers and other services whose operations were not always highly ethical in character, and which are often directed at the less informed and less articulate members of the community.

The main weakness of the Consumer Council was that it had no direct communication with consumers at grass-roots level. It did make several attempts to get approval for a national network of local advisory offices, but these were resisted by the Government, who regarded the services of the Citizens' Advice Bureau as adequate in coping with consumer problems at local level. Amidst considerable public outcry the Council was abolished in 1970 by the incoming Conservative Government.

The protests which followed the axeing of the Consumer Council were the cause of some concern within the Conservative Government, so it was not long before they introduced an alternative programme of their own to deal with the many issues on which action was needed, and which the Consumer Council had had to leave lying dormant.

The appointment of the first Minister of State for Consumer Affairs, Sir Geoffrey Howe, was welcomed from many quarters. This approval proved to be justified since the Minister went on to take a very active part in seeing through some very important consumer legislation, including the Supply of Goods (Implied Terms) Act in 1973, the Fair Trading Act which set up the Office of Fair Trading in the same year, as well as giving much encouragement to local authorities to set up Consumer Advice Centres.

Consumer information at local level

When the Consumer Council was axed in 1970 the Government was fairly satisfied that, at local level, the Citizens' Advice Bureaux could act as the main source of consumer information and advice. The Molony Committee had in fact recommended that the CABx should be expanded to provide a countrywide consumer advisory service. There are a number of reasons why the CABx have failed to achieve this.

There are now 670 CABx operating throughout the country handling about two million enquiries a year. As the main information and advisory point in a local community a Bureau deals with a vast range of personal and family problems, including housing, employment, pensions, education, marital, as well as consumer problems. Virtually all have local authority grants, but the size of these varies considerably and can be as little as £20 a year. Inevitably, therefore, even though there is a considerable back-up from the National Association of Citizens' Advice Bureaux in terms of information resources, the quality of the service varies throughout the country as the NACABx freely admit. However, CABx see themselves as GPs and like GPs can only operate efficiently if they are properly supported by specialists.

Some of the specialist services themselves have not, however, developed in any consistent manner throughout the country. Although there are now 152 Housing Advisory Centres in the UK, they are administered and financed in a variety of ways. Some are financed by local authorities, others through Urban Aid grants; others may be Housing Aid Centres operated by Shelter or may have grown out of local community action projects.

Legal Advice Centres have also developed very much on an *ad hoc* basis. Of the 116 Legal Advice Centres, only thirteen are actual Law Centres where enquirers can draw upon the services of full-time salaried solicitors, who will handle a client's case from beginning to end.

Except for places like Sheffield, where there is a legal information service to co-ordinate the work of the six advice centres in the area, and Camden and Hackney who have their own Housing Research and Information Centres, there is little in the way of information back-up services to these housing and legal advisory services; and certainly no *centralized* information service similar to that operated by NACABx for CABx and, on a less rigid basis, that operated by CA for Consumer Advice Centres.

Trading Standards Departments and consumer information

As far as the ordinary consumer's access to information and advice in the local community is concerned, it is necessary to look at the development of the local authority department whose job has been to enforce the various legislative measures designed to protect the consumer at this local level, namely the Weights and Measures Inspectorate, later called Trading Standards or Consumer Protection Departments.

Weights and Measures legislation has been operating for hundreds of years: even the Magna Carta had proclaimed that there should be one measure of wine, one measure of corn and one measure of ale throughout the realm! The present law on Weights and Measures is based on the 1963 Act. But it was not until the passing of the Trade Descriptions Act (the so-called 'Shoppers' Charter') in 1968 that the work of the Trading Standards Officers came into the public eye.

With the number of complaints about false or misleading descriptions that the Trading Standards Departments had to deal with under the Trade Descriptions Act (it was estimated that there would be 50,000 a year on average—in fact there were nearly 100,000 in the first year), it began to become clear to these local government officers that consumers generally could probably benefit from the technical knowledge these officers had about goods and services and about the laws relating to their sale or operation. Instead of hiding behind closed doors in the depths of some gloomy town hall, some departments began to make themselves more accessible to the general public by opening consumer complaints offices in locations near to shopping centres. This happened in the sixties in places like Sheffield and Bristol; but it was not until CA's experimental *Which?* centre in Camden began operating in 1969 that the idea of providing independent factual information about goods and services *before* they were purchased, as opposed to making complaints about them *after* purchase, really began to interest local authority Trading Standards Departments.

In the following paper Gill Clegg will describe further what we would regard as the logical and necessary step in the development of the provision of consumer information and advice to all consumers—the high street Consumer Advice Centre. After all, the man in the street should be just as entitled to have easy access to information, near to where he is situated, as the man in the laboratory or the man in the Ministry. Maurice Line has said that, for all users of information, 'expected ease of use, as well as physical accessibility, has a much higher priority than the expected quantity and quality of information.'[11] A large quantity of information, mostly of high quality, has been collected by various consumer organizations over quite a long period of time. What Consumer Advice Centres do is to make this information accessible to all.

2. Consumer Advice Centres (Gillian Clegg)

THE FIRST CONSUMER ADVICE CENTRE to advise consumers both how to deal with their shopping complaints, and to offer advice in the hitherto neglected field of help before buying, opened in Berlin in 1928. Established consumer advice centres have been operating for many years in several other European countries. The first British consumer advice centre, however, did not open its doors until 1969. This was the experimental *Which?* advice centre set up by Consumers' Association and housed in converted shop premises in Kentish Town, North London.

Consumers' Association's involvement stemmed initially from research it had carried out into the idea of presenting *Which?* in a more popular journalistic style—something similar to the *Daily Mirror*. The survey was conducted in working class areas of London. It revealed that, not only did the idea of a 'pop' *Which?* have little appeal to the respondents, but also that working class consumers were resistant to receiving their shopping information from print at all. They preferred it by word of mouth.

Peter Goldman, Director of Consumers' Association, explaining the experimental centre in *Which?* said 'We are always being told that comparative testing has limited use because you, who read *Which?* are a privileged minority. Your education makes you able and willing to deal with *Which?* reports and arrive at a rational buying decision. Most people are not, and these people we should be trying to help. The idea behind this centre is that it will give personal word of mouth information and so reach people who are just not getting it from print.'[12]

The experimental centre was modelled on what Consumers' Association considered to be the best working methods of the centres overseas, with a view to translating the consumer clinic idea into British terms and persuading local authorities to set up similar centres. The experiment was a success, and in 1972 when the centre had helped over 40,000 people, Consumers' Association withdrew and handed the centre over to the London Borough of Camden who continue to run it.

There are now over seventy local authority run consumer advice centres throughout the country. The present Government has consistently encouraged their establishment and the recent White Paper *The Attack on Inflation*[13] has announced that the Government is prepared to finance more centres by means of a special exchequer grant to local authorities. Applications for this grant are now in the process of being submitted. There will probably be at least one hundred centres by the end of 1976.

Consumer advice centres not only represent a readily accessible and new information source for consumers, but also one of the most rapid developments in local authority services, and in the design of their centres, authorities have abandoned what some may consider their normal austere image, and created attractive premises with an informal atmosphere to encourage the idea that getting advice on shopping is as easy as the shopping itself.

An average advice centre now handles around 20,000 enquiries a year, and that number is growing fast. Interestingly, too, traders are beginning to recognize that consumer advice centres are not, to quote from the trade press, 'retailer bashers', but impartial and responsible advice and information agencies. The number of requests for help and information received from traders is increasing, and in many areas the advice centre is used as an informal arbitrator for shopping disputes.

Most consumer advice centres are sited in premises in the middle of a busy shopping area. They use their shop-front windows for informative displays. People are encouraged to browse around, help themselves to the free leaflet material available and look at further displays inside. Several centres provide play areas for children. Obviously, the shoppers' shop concept is not feasible for local authorities with large rural populations. Some of these authorities are experimenting with mobile advice centres and some operate a system of peripatetic advisers.

So what exactly do advice centres do? Their functions break down into the following areas: general advice and information; detailed pre-purchase counselling; helping consumers resolve their complaints; consumer education. The staff who work in advice centres do receive training. They undergo an intensive nine-week training course which covers, basically, the law as it relates to consumer rights; useful information sources and how to use them; technical information on household products; training in interview technique.

The general information side involves handling the many requests for specific items of information which can be answered from local knowledge and available information sources. For example: 'Where can I get a spare part for a twenty-year-old sewing machine?'; 'Is credit sale the same as hire purchase?'; 'Where is the nearest pet shop?' Pre-purchase counselling, on the other hand, relates to enquiries less specific than the examples above, and usually involves the purchase of major household items where decisions are difficult because of the enormous choice of available products (there are, for instance, about two hundred different domestic refrigerators on the market). These are the types of product where large sums of money are at risk and where individual needs and circumstances vary most widely. Advice centre staff faced with this sort of enquiry, conduct an interview (which lasts for about twenty minutes) with the consumer to draw out from him his personal requirements. If he was interested in purchasing a washing machine, for example, they would ask such questions as how much money he wanted to spend, what size was his family, how much space was available in the kitchen, was the water pressure high or low. The centre staff would then give him, hopefully, adequate information based on his requirements to enable him to make his choice. Many advice centres have examples of household durables on permanent display so that advisers can use them to illustrate particular features to enquirers.

Pre-purchase counselling, it should be stressed, has nothing to do with recommending 'best buys'. Its purpose is to enable the consumer to exercise choice from a standpoint of information, not ignorance. Far too many complaints arise because shoppers are poorly informed and this short period of consultation before buying could save days of negotiation and worry in untangling a complaint afterwards. One major domestic appliance manufacturer is on record as saying that at least ten per cent of his service calls could be eliminated if consumers knew more about the appliances they were buying.

A relatively new aspect of advice centre work is the preparation and display of local price information. The present Government believes that price comparisons constitute a useful weapon in the battle against inflation and, again, exchequer grants are to be made available for more price monitoring work. Centre staff conduct a weekly price comparison of basic food products and household goods charged by named multiple shops in their locality. This information is displayed on boards, at present, only within centres themselves but the Government hopes that eventually it will also be displayed in libraries, town halls, shopping centres and published in the local press. The aim of price comparison work is to save the housewife's time in seeking out the cheapest buys, and to encourage more competition in the market place.

Advice centre staff act as impartial advisers to help consumers resolve their complaints quickly and fairly. When a criminal offence is suspected under legislation administered by the Trading Standards or other local authority departments, the complaints are referred to whichever department bears the statutory responsibility for them. In other cases, most frequently where civil dispute concerning faulty goods or unsatisfactory service is involved, the advice centre tells consumers what their legal rights are, acts as an informal arbitrator between trader and customer and, if necessary, arranges an independent test to establish the cause of the fault. If all this fails, the centre advises consumers how to achieve redress through the county court. Recently, some advice centre staff have extended their function to accompanying clients through county court proceedings.

The last major function of an advice centre's work is the provision of education on consumer matters to the local community. Advice centre staff frequently talk to local groups—particularly schools, women's organizations and local chambers of trade—on subjects such as how to buy wisely, and how the consumer is protected by the law. Often, too, the centre works closely with local schools in designing projects to be used in the classroom. Another important part of the consumer education function is the preparation of informative displays within the centre itself. Examples of typical displays are: the effects of metrication; the importance of correct shoe fitting for children; what to look for and think about when buying a carpet. Apart from providing information, these displays are a way of attracting people to the centre and, hopefully, breaking down any resistance they might have about using it when they have a problem. One London centre organized a cola tasting test which proved so popular that police had to be called in to control the crowd!

Most centres have a good working relationship with the local media which enables them to ensure that topical items are given local publicity. In areas where there is a local radio station, centre staff usually have a regular spot, and a number of centres contribute a regular column to the local paper.

Having discussed what advice centres do, let us now turn to their information needs. Because this is a relatively new information field, there are, as yet, few suppliers of the specialist information sources needed. The main supplier is Consumers' Association which has set up a special unit to service consumer advice centres. This unit not only supplies information but also trains advice centre staff and provides a consultancy service to local authorities on setting up and running centres. The design of these services and courses is based on the experience Consumers' Association gained from its pioneer work in this field.

A unique feature of the information packages sold to advice centres by CA's Advice Centre Servicing Unit is a five volume directory listing every nationally available product in twenty-two major household durable markets. The information includes the price of the product, its measurements, its controls and features, whether it carries a safety approval mark and whether it has been tested by *Which?*. Updated directory sheets for each product category are sent to centres quarterly, and, in addition, they receive weekly information on individual new products to enable them to be as up to date with the market as is possible. This directory, along with manufacturers' leaflets and *Which?* reports, constitute the main information sources for pre-purchase counselling. Other information produced by the Advice Centre Servicing Unit includes:

(a) A regularly updated *Directory of Consumer Information Sources*. Arranged by subject, this directory details trade associations, testing houses, legislation and publications related to that subject.

(b) Daily and weekly bulletins which abstract information from the national and trade press on consumer matters such as product safety, new consumer legislation, trading practices, new products and other items of consumer interest.

(c) A series of leaflets which outline the main points to consider before buying various household items. These leaflets are displayed in centres for people to take away, along with leaflets from other organizations such as the Office of Fair Trading and the British Standards Institution.

Centres subscribing to the information services also have the facility of a telephone enquiry service to Consumers' Association for problems they cannot resolve from their own resources. These tend to be the more complicated legal enquiries or requests for further product information, and the Advice Centre Servicing Unit can draw on all the specialist resources within Consumers' Association to provide the answer.

Despite the pressures of time, advice centres do manage to generate information of their own. This usually takes the form of information handouts to accompany displays, such as lists of qualified shoe fitters in the area, explanatory information on the different ways of insulating the home. Some centres produce their own leaflets on subjects like buying a second hand motor car, door to door selling practices, and several centres have published, very successfully, shopping guides for old age pensioners which list local shops prepared to give discounts or sell small quantities to the elderly.

A close liaison exists between advice centres and the Office of Fair Trading. The Director General of Fair Trading sees centres as his 'eyes and ears in the market place'. The centres supply the Office with details of all the complaints they receive. This information is coded according to subject and trading practice to enable the Office to establish a nationwide pattern of the problems causing the most concern and therefore which trading practices and which individual traders the Director General should take action on under the Fair Trading Act 1973.

Additional information sources used by the advice centres are, of course, the standard reference books and trade directories. This is one of several areas where it would be nice to see more co-operation between advice centres and local libraries, since both are providing complementary information functions within the community. Few centres have, as yet, built up close links with their local libraries but there must be enormous scope for co-operation, particularly in access to information and in publicizing each other's service.

For any consumer advice centre to be successful, it must receive maximum publicity, especially in its early stages. This is normally achieved through leaflets and posters describing the service, and articles and broadcasts in the local media. Some centres are experimenting with less conventional methods such as printing the centre's address on beer mats, carrier bags and T-shirts. Word of mouth publicity is also important, particularly to promote interest in pre-purchase information which is unfamiliar to most consumers.

These types of publicity are fine for the reasonably aware consumer, but how do centres attract those who are less advantaged? This is an area where more work needs to be done, and it is particularly important that centres develop a close liaison with the local social service departments, home helps and those running adult literacy schemes to ensure that the centre's services are generally known to the community. Several authorities do now issue pre-paid complaints cards which are available from various local authority offices and taken round by social workers. Several authorities with large immigrant populations are beginning to translate leaflets into immigrant languages and also have qualified interpreters available when necessary. Many centres keep information on products designed specifically for the disabled, and at least one centre distributes complaints cards in braille to the registered blind to be returned to the centre when they have a problem.

Consumer advice centres are, of course, only one of the specialist advice agencies operating at local level. Apart from established bodies like the Citizens' Advice Bureaux, we now have legal advice centres, housing advice centres and a whole host of voluntary advice agencies. It would be unrealistic to imagine that consumer advice centres—using the narrow definition of consumer as shopper used throughout this paper—can operate successfully in isolation.

People do not always have neatly packaged problems. The woman with problems concerning hire purchase and budgeting may well have associated problems with her marriage and is perhaps not fully utilizing the services available to her from the welfare state. The various agencies do, at present, operate a loose referral system and some consumer advice centres do share their premises with other bodies. Many people involved in giving information and advice at local level are pressing for much closer liaison between these agencies, and it is interesting to note that several local authorities are now planning advice centres which incorporate the Citizens' Advice Bureau, consumer, housing and legal advice centres.

Should we therefore look towards the establishment of the High Street multi-purpose centre representing only one port of call for someone with a problem? Or would this create a more bureaucratic atmosphere which could deter those most in need of help? The provision of consumer advice in the High Street is still in its infancy, but the time has come for local authorities to assess and co-ordinate existing facilities to avoid duplication of effort and confusion to the consumer. It is important, though, that in doing so they do not lose sight of the basic concept of providing a people's advisory service which is efficient yet informal.

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A public right to know

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Paper presented at the 49th Aslib Annual Conference, Van Mildert College, Durham, 22nd–25th September 1975

I BELIEVE IT IS, or was, the case that libraries in the Republic of South Africa do not stock copies of *Black Beauty*; nor children's stories about little black rabbits and little white ones. Similarly, it is said to be impossible to get Darwin's *Origin of the Species* in the so called 'Bible Belt' region in the USA; and I have no doubt that it would be provocative—and also futile—to request a copy of, say, *Animal Farm* from the Lenin Library in Moscow.

If all this matters, then it matters also that, in this country (and elsewhere) it is impossible to obtain legitimately from anywhere a great deal of hard and relevant information about such things as the performance of government, the expenditure of public funds, many aspects of commercial and other corporate activity—indeed, about a considerable amount of the decision-making that is carried on 'in the public interest'.

It would, of course, be improper to associate these unusual examples of bigotry with the more usual problem of secrecy in major centres of power—were it not for the fact that secrecy is, all too often, an expression of bigotry, deriving from the narrow minded, and fundamentally undemocratic, view that government is the business of governors, and that the public have neither the need, nor often the ability, to understand the decisions that are taken in their name. Another reason for associating these seemingly different examples is that both in fact illustrate a wider point—that the information the public gets is, by and large, the only information they are allowed to get.

Having said this, a distinction should of course be made between 'secrecy', on the one hand, and 'the abuse of secrecy', on the other. The reason I did not make this distinction at the outset is that in this society (among others) no real distinction between the two exists. It is not possible, in practice, to distinguish between the two, when disclosure of information is the exception, and secrecy the general rule—and when those who have the information are those who also decide whether or not it should be disclosed. To be specific, a case can certainly be made for withholding certain kinds of information relating to defence and national security, but that case is debased when the same degree of secrecy is imposed to withhold, say, information about dangerous handling characteristics of vehicles for the disabled. Similarly, secrecy (or, rather, privacy) must be justified in the case of personal information. At the same time, it is a nonsense to afford to a major public company the same right to privacy as an individual citizen, when this entitles a company to keep secret, for example, information about the amount of its pollution to land, water or air.

Aslib Proceedings, 28 (2), February 1976, p. 69–75. Printed in Great Britain.

The rule of secrecy in central government is enshrined in law. In particular, there is section 2 of the Official Secrets Act, though this serves mainly as a backdrop to a variety of formal and informal measures which work to the same general effect. Section 2 of the Official Secrets Act—a law which was enacted virtually on the nod, in the panic of the build-up to the First World War—provides basically that it is a criminal offence either to give or receive Crown information, unless its release is authorized. The effect of this has been to allow governments to release only that information they would wish to see made public, in rather the same way as companies' performances have very largely been defined publicly through advertising and PR.

The fact that the Official Secrets Act has survived since 1911 can be attributed largely to the fact that prosecutions under this law can be made only at the discretion of the Attorney General. Had this not been so, the courts would no doubt have been flooded with so many manifestly absurd examples of the abuse of secrecy, that the Act would have been recognized for what it really is, a long time ago. To cite some recent examples:

- A provincial journalist was threatened with prosecution under the Act by the police, for obtaining and publishing their hot weather dress regulations (which revealed under what climatic conditions they might go about their business in shirtsleeves).
- A Post Office employee was recently threatened with prosecution after writing to his local newspaper—in which there had appeared complaints about the slow service—to explain that the Office was undermanned.
- A worker at a nuclear power station declined to show a reporter from *The Sunday Times* a scar on his arm (caused by an accident at work, involving the use of plutonium) because, he was reported to have said, he feared prosecution under Section 2.

And, finally, it has been alleged that a student employed temporarily as a gardener in the grounds of Hampton Court was required to sign the Official Secrets Act, before being allowed to commence her work. (Signing the Official Secrets Act—as many of you have probably done—is, incidentally, a ritual of no legal significance whatever—as one is bound by the provisions of the Act, whether one likes it, or understands it, or not. The significance of signing the Act is a bit like kneeling in Church: it doesn't make you a more devout person, even if it may make you think that you are.)

But, for all this, the Official Secrets Act has survived, and has worked generally to reinforce the unchallengableness of executive power. It has guaranteed a high degree of secrecy in government which, as always, has been calculated to secure political advantage, to the consistent disadvantage of Parliament, the public and the press.

Take Parliamentary Questions, for example, as one of the increasingly few means open to backbench MPs to challenge and attempt to control executive power. The pages of any *Hansard* will reveal many examples in which MP's requests for information have been denied outright—and many others in which the government has taken evasive action. The Member, typically, is in the position of Owen Glendower (Henry IV, Part I) who boasted that he could 'call spirits from the vasty deep'—to which Hotspur sardonically commented: 'So can any man. But will they come when you do call for them?' But, quite apart from the fact that a Parliamentary Question may never get a proper answer, there is an increasing number of issues on which questions may not even be tabled at all. Under Table Office procedure there are about one hundred subjects which may never be raised on the floor of the House. These include such things as the affairs of the Sports Council, Forestry Commission contracts, rents paid for government offices, agricultural workers' wages, forecasts of changes in food prices, details of air-miss enquiries and council house waiting lists.

Then, consider in more detail just two of the countless examples of secrecy as it affects a wider public. Both examples relate directly to the enquiries made by *Public Interest Research Centre* into the exercise of social responsibilities by industry:

1. Until 1974, extraordinarily, a Factory Inspector was not allowed to inform shop-floor employees about the actual hazards they might have faced at work. An inspector was empowered to monitor a workplace for the presence of, say, toxic chemicals, but he was not allowed to pass on to employees or their representatives details of the results so obtained. As a result, it is absolutely certain that, over the next 30 years or so, many people will become ill, or will die, simply because they were not given sufficient information to save them.

Since 1974, thankfully, the law has provided that workers might receive certain information of this kind; however, neither we nor they know exactly what information they may or may not be given. Sometime after the passing of the Act, a press release put out by the new Health and Safety Commission referred to the fact that: 'Guidance has been prepared for the Executive and local authorities on the disclosure of information to workpeople by inspectors . . .' But when we telephoned the press office of the Commission, to ask for a copy of these guidelines, we were told that these were not available. We asked why. The press officer said: 'There must be a reason for that, I agree'—but she was unable to give any reason at all. She did, however, confide (was it by way of consolation?) 'I nearly sent it to some MP who asked for it, and got into hot water for it . . . I have not been able to allow MPs to have this.'

2. The second example concerns the work of the Alkali Inspectorate, the government agency responsible for the prevention and control of industrial air pollution.

Here is a public body, working—in many ways very effectively—towards the solution of a public problem, but which throughout its history has worked in conditions of utmost secrecy. To this day, for example, the Alkali Inspectorate refuses to make public the names of firms either responsible for infractions, or prosecuted for allowing them—just as information is withheld about the measures taken to control pollution at different plants—in direct defiance of the recommendations of the Royal Commission on Noxious Vapours, which reported in 1878.

The traditional reason given for maintaining such secrecy—that information about the level of pollutants would lend some commercial advantage to a firm's competitors—was virtually wholly discounted by the present Royal Commission on Environmental Pollution, in its second report, published in 1973. Since then, we have established that whatever the reason may be for withholding information about the performance of individual firms, it is certainly not to protect the interests of the firms themselves.

We now know this, as a result of the extensive enquiries PIRC has made into the work of the *Avon Rubber Company Ltd.* In the course of this enquiry, the Chief Alkali Inspector was invited by *Avon's* Chief Executive to co-operate with PIRC, and to make available any information they could about the Company's record in controlling emissions to the air. Of the several government agencies invited to co-operate with PIRC in this way, only the Alkali Inspectorate refused outright, giving no explanation for this, other than that the information requested was 'confidential to the Chief Alkali Inspector'—an explanation which was as worthless as the information the Inspectorate was able to provide. (I have given this example, incidentally, by way of reference to the *Social Audit* report on *The Alkali Inspectorate*, which we published last year, and also as a preview to the *Social Audit* report on *Avon*, which will be published within the next few months. The report on *Avon* deals extensively with the question of disclosure of information by industry and by central and local government and other bodies. It is the first such enquiry of its kind, in that the investigation of this company's social performance was carried out at the expense, and on the initiative, of people who work together as a pressure group—but who nevertheless secured extensive co-operation from both the management and trade unions concerned.)

To see these examples in perspective, it must be recognized that secrecy does not exist directly because of the Official Secrets Act; though it is because of the existence of the Act that secrecy cannot be challenged when it is imposed in this way.

In the same way, government secrecy is maintained under the specific provisions of some sixty different statutes—most of which relate to government control of industrial and commercial activity. For instance, under S. 28 (5) of the Trade Descriptions Act 1968, Trading Standards Officers are prohibited from making public any information they acquire in the course of an investigation into a company's affairs—whether or not the complaint which led to the enquiry is proved to be justified. Similarly, a river authority employee who disclosed information about a discharge of polluting effluent from any particular firm used to be liable on conviction to exactly the same fine as the polluter itself would pay. This law proved so frustrating to one authority that it resorted to monitoring the level of pollution both up- and downstream of offending plants, and then publishing the results. In this way, one needed to read between the results to find out more or less exactly what any particular firm had been doing. I have raised this example as an exception to a general rule. Whatever restrictions may be made in either specific or 'catch-all' laws, it must be recognized that secrecy is as natural and as essential to power as is the need to preserve and augment that power. For this reason, secrecy will always exist unless laws or other measures are introduced to ensure that it is curbed.

Secrecy begins at home: 'not in front of the children'. In some homes it may even be flaunted—by parents who go so far as to announce 'pas devant les enfants', devant les enfants. Similarly, secrecy is a device which unites, and therefore strengthens, groups of people, ranging from children in playgrounds, to masons in aprons. But that is, by and large, their business.

To illustrate further the point about secrecy existing without backing in law, one might consider, for example, the work of local authorities—for their business *is* public business.

It was in Bristol that my colleagues and I fairly recently encountered the nicest example of the folly of secrecy that we have ever learned of. We had applied, for some good reason, to examine the record of the minutes of the Corporation, but were refused, on the grounds that we were not ratepayers, even though we had expressed ourselves willing, and able, to pay the statutory inspection fee of one shilling. In the circumstances, we were forced to go out into the streets and find a sympathetic ratepayer—a stranger to ourselves and to the clerk—before they would agree to open the books.

But, more seriously, the amount of secrecy in local government must be considered comparable to that in Whitehall, if only because both have succeeded in keeping the ultimate secret—the extent of the secrecy that exists. However, one can get some idea of the nature of the problem from the fact that 'reports ... alleging secrecy and lack of co-operation' by local authorities, recently prompted the Department of the Environment to issue a circular (45/75) calling for 'greater openness in the conduct of public business by local authorities'. When central government—itself the greatest culprit—makes representations of this kind, something would seem to be seriously wrong.

With industrial and commercial companies, both publicly and privately owned, the situation is essentially the same. At least, the extent and nature of secrecy is much the same, though the justification for it may appear to be different. It might be considered almost unsporting for a company to have to disclose information which may do it no good, or no credit, because companies are, after all, acting on their own behalf, rather than on behalf of the people. For this reason, an official of the *Employer's Engineering Federation*, speaking at a conference in 1973, felt able to define quite openly one aspect of the relationship between secrecy and power. 'Putting the matter quite bluntly', he said, 'in collective bargaining situations, if you have got access to relevant information which the other side does not have, then this is an advantage which you usually prefer to retain.'

Very much the same considerations would apply in the case of information companies hold about, say:

- manpower planning policies—relevant to employees' job security
- safety, quality or durability of products—relevant to consumers
- pollution control measures—relevant to the health and welfare of members of the local community
- the control of accidents and ill health at work—again, of critical relevance to employees

In each of these, and many other, cases, the policies and practices pursued by different companies may have major public effect—and, as such, they should be open to public question. I am convinced that it is no longer sufficient for the business community to consider the purpose and practice of business as self-justifying—to suppose that business owes no more to the community than it provides by its very existence. Increasingly in the future, business will be required to make known the real social cost, and contribution, of financial profitability, so that the public may judge for themselves whether business is done in the public interest, as spokesmen for business say that it is.

In conclusion, I shall turn to the question of remedies, and also to the specific relevance of the situation I have outlined here to this convention.

The present Home Secretary is committed to the repeal of the Official Secrets Acts. He said as much when, in opposition, he gave evidence before the Franks Committee on Section 2 of the Act, when he stated, among other things, that: 'It would be almost impossible, on a strict observance of the . . . Act, to hold any intelligent conversation at all which was not self-consciously on an extremely remote range of subjects.' What happens in practice, therefore, is that 'a Minister or senior civil servant, nearly every time he indulges in any general conversation about the affairs of the day, or about any aspect of his job, is in technical breach of the Official Secrets Act.'

But the fact that the Act may be repealed is now of relatively limited significance; much more important is what is to be done in its stead. Briefly, there are three possibilities, which I have ranked in increasing order of attractiveness—if not necessarily in increasing order of likelihood.

1. Replace the Act with similar measures, more credible as law. The Franks Committee recommended doing precisely this. The Committee's proposal would, as one commentator has put it, have the effect of trading in a blunderbuss for a rifle.
2. Do nothing. Rely instead on less formal measures, such as civil service disposition and discipline; and otherwise resort to such means as D-notices, or to the conspiracy, or other laws—such as the Theft or Copyright Acts.
3. Legislate for a 'public right to know' along the lines of the Swedish and US models. These basically provide that: (i) all government information be made publicly available, subject to several carefully defined exceptions; (ii) there be a right of appeal to an independent body in cases in which a refusal to divulge information is given.

So far as government information is concerned, nothing short of legislation for a 'public right to know' can be relied upon to substantially change the present, unconscionable situation. Where information held by corporate bodies (of all kinds) is concerned, it would similarly seem necessary to legislate for effective disclosure, though for political reasons, such legislation would quite probably need to be introduced piecemeal. Why should there be any well-founded objection to this, on principle, in the light of existing legislative requirements for the disclosure of, say, companies' financial information? If the law requires there to be financial audits, for the benefit of companies' shareholders, why should there not also be 'social audits', prepared for the benefit of employees, consumers, members of the local and wider communities—indeed, for everyone affected by what a company does?

I hope it will not seem presumptuous to suggest that librarians, as professionals concerned with the use of information, will be particularly concerned to see—and to seek—substantial changes in this present situation.

Library science—the science of the storage, retrieval and application of information—can, after all, be only a means to an end. In the examples I gave at the outset, I implied that the value of this science would be limited if libraries were to exist simply as repositories of approved information or orthodox thought. Clearly, there is a need also for a political commitment, to ensure that information of all kinds can be provided as, when and wherever it is needed as a means of improving on our present lot.

DISCUSSION

MR DONALD LEE (Greater Manchester Passenger Transport). When can we hope to see local branches of PIRC set up, as local investigations are surely needed.

CHARLES MEDAWAR. It is unlikely that local branches of PIRC will be set up. The struggle for existence is so great that expansion seems impossible. We wish to remain small, but welcome a wider adoption of our principles.

MR P. F. COLE (British Petroleum Company Limited). Although Mr Medawar has argued his case for a public right to know very cogently he has not indicated what role he thinks the information will play when he succeeds in placing it in the public's hands. Will he please comment, with particular emphasis on company information.

CHARLES MEDAWAR. More information would not only enable the public to better appreciate—and perhaps more readily accept—the decisions that are taken in their name. I believe also that a better, fairer society will exist when the public can thoroughly check, test and stimulate the work of those who take decisions which have major public effect.

MRS GILL WILKINSON (National Radiological Protection Board). Does the speaker think that a less secretive administration would lead to a more responsible press?

CHARLES MEDAWAR. I am certain that the provision of more information would improve the quality of the press (though I am less certain that we would agree on what is and what is not responsible behaviour by the press). If nothing else, the provision of more hard information would mean that reporters would need to spend less time ferreting for information and more time analysing it.

Information, education and entertainment

Edward Rayner
Chief Assistant to Head of Publicity, BBC

Paper presented at the 49th Aslib Annual Conference, Van Mildert College, Durham, 22nd–25th September 1975

TWO OF THE FIRST QUESTIONS I was asked to decide when preparing this paper were these: did I want to use visual aids (they asked the BBC); and what did I want to call it. A letter the Association sent to the BBC said this about the first: 'The main purpose of using visual aids is to communicate information *more effectively than is possible by speech alone.*' From that day on, we have hidden the letter from our colleagues in BBC Radio. And I want to speak on behalf of them, as well as Television.

But then, into my office came another piece of paper: the daily summary my department prepares of newspaper references to the BBC and about broadcasting matters in general. The penultimate item said this: 'The British Psychological Society have been told at their annual conference that "visual tricks"—such as the use of an action background projected behind a newscaster—can make the person on the screen seem much more credible.' My decision was made. There *will* be visual aids.

The title was much more simple. Anyone in the BBC who does not recognize it is likely to be hurled into the dungeon we keep for people who say hōmōsexual, instead of homosexual, and where they're likely to meet the football commentator who said: 'Here he is—the debutante making his debut in his first game for Arsenal.' Or the chap on Local Radio who referred to someone as a 'venereal old man'. And the newsreader who said the Israelis were being attacked by Lesbian forces.

But, for this audience, I mount the same hobby-horse that I ride on behalf of our audiences everywhere. And because I believe passionately that no broadcaster should assume too much prior knowledge on the part of his audience—and not because I believe we should talk down to our audience—because of that serious belief, I will explain it to you, if I may.

My title is based on these rather solemn and formal words: 'Whereas in view of the widespread interest which is . . . shown to be taken by Our Peoples in the broadcasting services and of the great value of such services as means of disseminating information, education and entertainment, We believe it to be in the interest of Our Peoples in Our United Kingdom and elsewhere within the British Commonwealth of Nations that the Corporation should continue to provide broadcasting services. . . .' The words are the Queen's. And they are from the BBC's Royal Charter.

To inform, to educate and to entertain. Those are, basically, the BBC's three jobs. Jobs it has been doing now for over half a century with varying degrees

Aslib Proceedings, 28 (2), February 1976, p. 76–83. Printed in Great Britain.

of success. Jobs which we do through four radio networks, twenty local radio stations, two television networks and through the External Services, broadcasting round the world in forty languages. One of my colleagues worked out how much it has cost to inform, to educate and to entertain one man who bought his first ten-bob licence when we started in 1922 and who has bought every licence issued since—radio, black and white television and colour television (and I assume that the man has now bought the latest £18 licence). How much for fifty-three years' service? The answer is that he would have paid the grand total of £164.

But, having spelt out those roles to you—information, education and entertainment—I have to confess that there are many occasions when we could not put a *single* label on a programme: information, education or entertainment. Perhaps on *most* occasions that is true—because the programme may contain elements of all three. And, most of the time, that's how it should be.

Of course, the Nine O'Clock News is there to give you *information* about what is going on in the world. But can we say that you will never be *educated* by what you see and hear? Should we apologize if you find some of the News—or the way we present it—*entertaining*? I am not suggesting that it is a laugh a minute (especially these days). And I am certainly not suggesting that Richard Baker should sign off with a song or play us out on the piano (though, as you know, he could do both very nicely). But, when he is reading the news, does he not 'occupy you agreeably', to borrow a definition from the Oxford English Dictionary?

Was no one informed and educated about the works of Galsworthy when we introduced them—and, no doubt, to many people for the first time—in *The Forsyte Saga*? Of Tolstoy when we gave you *War and Peace*? Or Trollope when we gave you *The Pallisers*?

Did Kenneth Clark not entertain you with 'Civilisation', as well as inform and educate you? Or Bronowski with 'The Ascent of Man'? And is there not laughter as well as truth in the antics of animals in 'The World About Us'? And what about all those 'Letters from America' that Alistair Cooke has been sending us? Information, education or entertainment? He was told (when he began) to forget politics altogether—though, over the years, he found that an impossible brief when two of the Kennedys were assasinated and Nixon was forced to resign.

But to return to that earlier hobby-horse of mine, Alistair Cooke knew better than most that he was addressing a very mixed audience who were not all as well-informed—and who ranged, as he put it, from shrewd bishops to honest carpenters. Of course, he *knows* about politics. But he knows about people, too. And I think he knows about *life*. For me, he showed it best of all in something which you will be sorry to hear we cannot listen to—because he wrote it in a preface to a collection of some 'Letters from America':

> 'It would be a crime against nature for any generation to take the world crisis so solemnly that it put off enjoying those things for which we were presumably designed in the first place, and which the gravest statesman and the hoarsest politician hope to make available to all men in the end;
>
> I mean
>   the opportunity to do good work;

> fall in love;
> to enjoy friends;
> to sit under trees;
> to read;
> to hit a ball
> and bounce the baby.'

And broadcasting itself, certainly any comprehensive public broadcasting service such as the BBC aims to be, must keep us informed, and in touch with, the whole of life. It is perhaps one of the few things we have in common with the *News of the World*: 'All human life is there'.

If it is not an undiplomatic thing to say, I do not like to speak on occasions like this with a string of other people's quotations. It has always seemed to me to be the lazy man's lecture. But would you permit me just one more to illustrate the job we are trying to do? It is from a lecture, actually one delivered earlier this year by Huw Wheldon, a distinguished broadcaster himself and now coming towards the end of seven years as Managing Director of BBC Television:

> 'The range of voices heard in this country has widened out of all reckoning during the period of television. They speak from and for people who, left to themselves, will apparently invent endless games and play them and watch them; invent constitutions which defy precise definition, and which call for constant questions and questioning; who will take an endless interest in gardens and natural history and exploration; and who show an equally endless appetite for stories and plays which they will invent and act for each other without stopping. The voices also speak from and for a liberal, democratic country, full of diversity, accustomed to unity, committed to change and steeped in the Christian tradition. And as the country moves forward towards new forms of belief and behaviour, the achievement is *to let these voices sing....*'

He is, by the way, a Welshman....

Well, now it is time for one BBC man to admit to bias. I am, by training and by most of my professional experience, a news man, a journalist. I say that because my next proposition is that if there is one single thing upon which the BBC's reputation has been built, I would say it is its news service. 'It was on the news' is, I think, still good enough for most of us.

And not only in this country. There are many still alive in Europe, for instance, who remember the risks they took to listen to the BBC during the last war. There are others still today who take such risks to listen to us. I mentioned earlier the BBC's External Services, broadcasting in their many languages for some 700 hours every week. One of those languages, you will not be surprised to hear, is Russian. Which leads me on to tell you two short stories.

When Boris Pasternak died some years ago, hundreds of people turned up at his funeral in a small village outside Moscow. Nothing surprising about that, you may think. Except that details of those funeral arrangements had been suppressed. And they had become known through a BBC Russian broadcast.

The other story is told by the Russian scientist, Zhores Medvedev, in his book *A Question of Madness*. He had been released from the mental hospital where the Soviet authorities had sought to detain him because of his unorthodox views. And the first thing he did when he got home was to turn on the BBC Russian Service and listen to a news bulletin. One of the items was the announcement of his release, followed by a commentary analysing the predicament of dissident intellectuals in the Soviet Union and the methods used to silence them.

Perhaps there are no better stories I can tell to meet your conference theme . . . the role of information in a changing world. Mind you, one of the main aims of the information service of the journalist and the broadcaster has always been to map that changing world. To chronicle the passage of history. Sometimes they can let the characters of history tell it in their own way and in their own words. In the synopsis of my paper which you have published in the Handbook, I have said that the obligation of impartiality in the BBC is a self-imposed one. The fuller story is not quite as simple as that. True, our Licence requires us to broadcast an impartial account of the daily proceedings of Parliament. True, a Prescribing Memorandum from the Secretary of State requires us to refrain from expressing our own opinion. But the recognition that we should treat controversial subjects with due impartiality—that is an assurance given by a former chairman, Lord Normanbrook. And the Secretary of State's Memorandum takes note of this.

But in another, very real, sense, it is self-imposed. It is self-imposed by anyone in the BBC who deserves to be called a professional journalist. Because, to him or her, anything else should be anathema. And, speaking as a journalist, I think the thing that annoys me about the occasional lapse is that it is just second-rate journalism. And that is not good enough.

Alongside impartiality, I must discuss independence—and, particularly, independence from Government. Because, I believe, it is only if we maintain that impartiality, and it is only if we preserve that independence from Government, that our reputation will survive. There have been times though—to return to your theme—when the role of our information in this changing world has been questioned and challenged. I think of Suez, in 1956, when some people, including some in Government, thought the national interest (as they saw it) should override the normal canons of impartial journalism. They challenged our right to report—and to broadcast to the area of conflict—the facts of the divisions in public opinion which existed at that time. We maintained our independence—and our impartial service.

The same sort of arguments have arisen over Northern Ireland. And, frankly, the editorial decisions we have had to make over Northern Ireland have been among the most difficult we have ever faced. Because we have realized all along that the manner of our reporting can affect the emotions and the fears and the actions of our viewers and listeners in Northern Ireland. And *that* is a very heavy responsibility.

We have said publicly that we are not impartial in one respect—we are not impartial between the British Army and the IRA, because we find the IRA's terrorism as abhorrent as *you* do and we report their campaign of murder with revulsion. But can we pretend—in the name of patriotic censorship, perhaps—that their actions are not part of the reality of the situation? How long would anyone believe us?

It would be easy to devote the whole of this paper to this one subject. And, of course, I would be happy to discuss it in more detail later. So, if I move on now, I hope you will accept that it is not because I feel defensive on the subject, but because of the other subjects I must cover in the time.

For instance, I ought to mention the information service we tried to provide during the Common Market Referendum. Some people, I know, said that we could have done still more—more explanation and analysis, for instance. But we felt that it was one of those subjects where there was little agreement about the facts and little chance that any explanation or any analysis would be accepted as impartial. We did our best—we had been anxious, in fact, that we should not *overdo* it—and the audience reaction, I think, was satisfactory. We did not, I know, satisfy Mr Wedgwood Benn and I suppose we shall have to live with that knowledge.

I ought, too, to mention the latest developments in broadcasting. Because broadcasting could well change a lot by the end of this century. In fact, of course, it has changed a lot already in the last half-century. For the schoolboy in the 1920s, the cat's whisker was the latest miracle in his changing world. If he had let his imagination run away with him, I suppose he *might* have imagined that one day he would be listening to the man on the moon.

But, for some people, it was not necessarily the moon they wanted to hear about most. It was their own local community. And so you have a network of twenty BBC local radio stations and a similar number of commercial stations developing, too. The BBC stations see their first priority as being to inform—to tell people what is going on in the community around them, giving them the chance to talk about it among themselves and with their 'rulers'—their local MP or their local government officials, say. Or it may mean giving blind people information about changes in the placing of bus stops. Or information about local vacancies for people looking for a job. Or detailed information about local power cuts. Or about weather changes threatening the potato crop.

In a decade or so, it is technically possible to have a network of local television stations. And, perhaps before that, it will be possible for that farmer worrying about the potato crop to put a regional weather forecast on his television set when *he* wants to see it.

In fact, if you had a few hundred pounds to spare—and if you could get hold of some rather scarce equipment—you could press three buttons on your set and get what is known as CEEFAX, invented by BBC engineers, and using what a layman might call a gap in the existing television signal on 625 lines. *You* choose the information service *you* want, when you want it, by pressing three buttons. Perhaps the *FT* Index for the stockbroker or the investor, or perhaps just the latest news summary. This is a two-year experiment taking place *now*.

Another possibility concerns road traffic information. Not every part of the country is covered by a local radio station. And if you were driving from London to Scotland, would you want to re-tune every time you pass from one station's area to another? And how many times have you heard Tony Blackburn on Radio 1 bringing you a traffic flash from somewhere hundreds of miles away? What our engineers believe is possible is a new network of local transmitters so that, wherever you were driving and whatever you were listening to, you could get regular—and only *local*—reports of traffic and road conditions.

It could be done with a piece of equipment the size of a cigarette packet. With all the information pouring out (on radio and television) daily and with all these possible developments, it must seem paradoxical that a person in my position should be concerned about whether the BBC is getting its message across.

My own department, of course, has a special responsibility. It is our job to explain programme plans and policy to the Press. It is our job to publish the BBC's annual *Handbook*. It's our job to produce *BBC Record*, a slim document of factual information sent to people like MPs and members of our many advisory councils. It is our job to publish, too, policy booklets, often the texts of speeches and lectures by the BBC's Chairman or Director-General or other senior executives. But I hope it does not sound too much like the workman blaming his tools, if I say that the Press, in the main, is more interested in programme news than policy. To be fair, perhaps because they know that their readers are, too.

I think the problem came home to me when I last addressed an outside audience. It was a much smaller audience than this. But I was very glad that I made the journey. Because, in answering one question afterwards, I discussed the procedures inside the BBC for dealing with complaints—and sometimes praise too—from members of the public. I assured one lady that if she had complained to the Chairman's office—as she had—he would expect to hear about it. And I assured her that much of the Director-General's time is taken up with replying personally to letters. I explained that regular reports are circulated of the correspondence and telephone calls received centrally, and that reports of reaction are made by the Directors of Programmes at their weekly meetings with senior staff in both radio and television. And I explained that it was the role of the Board of Governors to act as the trustees of the public interest. And that our principal advisory body, the General Advisory Council, had among its members MPs from the three main parties and representatives from many other walks of life—and that they were not hesitant about voicing their anxieties and their criticisms. And, at the end of my meeting, one of the ladies said: 'So you do take notice of what we say, then? I always thought you ignored what we thought and just carried on with what you thought best.'

To me, that is one of the worst reputations we could earn. Because it would suggest that a major public service was thought to be run by people who did not regard themselves, truly, as public *servants*. Fortunately, I know that it is not a reputation which is deserved by most people I know in the BBC. Only last week-end, I remember, the Controller of BBC-1 was telling a convention that bad language was the largest single cause of complaints about taste—and that he had to explain to distinguished contemporary playrights that what might be acceptable in the theatre or in the cinema was not necessarily acceptable in the family circle around the television screen.

But I wonder how many people shared that lady's lack of knowledge of the trouble we take over the handling of complaints? How many know that four years ago we set up an independent Programmes Complaints Commission, currently chaired by Sir Edmund Compton, the first Ombudsman? How many, indeed, know that the Board of Governors is there as the trustees of the public interest—and that it is not chosen by the BBC? I would go further: how many politicians who criticize that body—who, perhaps, call for a Broadcasting Council—know that the Governors are appointed by the Queen on the advice of the Government, on the advice of politicians. So that the politicians have only themselves to blame if they feel that the Board lacks this or that.

How much public knowledge is there of the various propositions for the use of a fourth television channel in this country? Do we have a responsibility to see that they are better informed about such a matter through our programmes—is it not a proper matter for public interest? Or are we too inhibited by the fact that we have a fully-stated case of our own to argue?

I was interested the other day to notice that the IBA had published a revised code on advertising. And the Authority announced that it was proposing to broadcast announcements about the availability of the code.

Speaking personally, I wondered whether we should broadcast announcements about the availability of similar literature from the BBC? Or would that be thought to be an abuse of broadcasting time? And is our public accountability satisfied by the present sort of distribution of our literature, by the existing structures and procedures and the vast volume of daily correspondence with members of our public? If I do not give ready answers to these questions, I hope you will accept it as a sign that we are constantly considering whether our attitudes and practices are right. If I say that I would like to hear your views, I hope it would not sound trite, but sincere. And I hope it will be one small sign that if we look on our history and our achievements with pride, we look on our tasks as public servants with a due humility as well.

DISCUSSION

MR RICHARD HINDSON (British Steel Corporation). Speaking as a private individual, not as an employee of the British Steel Corporation, I would like to comment on what appears to me to be the selectivity and possibly the bias of the BBC. Many news items over-emphasize the 'bad news' aspect of events. Later, rather technical, explanations of the course of events are not, in my experience, adequately reported—for example the Flixborough disaster. In addition the selection of subjects and topics is somewhat odd. Football, cricket and possibly horseracing appear to be the main leisure interests of the BBC. More people go fishing on Saturday afternoon than watch football—or so I understand, not being particularly interested in either activity. The BBC does not seem to want to explain to the population at large how the state or how society works. Yes, the BBC was overwhelmed with the European Community question, but what about the reorganization of local government, the health service, the workings of the great departments of state—all of which affects every citizen. I am puzzled by the policy of the BBC in these matters. Perhaps Mr Rayner would care to elucidate.

MR EDWARD RAYNER. I am suprised at what you say about the reporting of the Flixborough disaster—and I doubt whether it would stand up to closer examination. On the latter part of your question, I think you will find that much has been done in programmes to explain how the state and society works—'Analysis' on Radio 4 springs to mind as do our current affairs programmes on television and the Westminster programme on BBC-2. To be fair to the opposition, Granada Television has also done some of this type of work. Apart from the question of access to Whitehall departments and so on, the opportunity to broadcast parliamentary proceedings would help us to do this job more fully and I would expect it to provide more attention to Standing and Select Committees.

MR JOHN GURNSEY (Institution of Electrical Engineers). Does the BBC not assign too much importance to the views of minority pressure groups of the type of the National Viewers Association and Mary Whitehouse?

MR EDWARD RAYNER. I am interested that you should feel that; I have sometimes wondered the same thing myself. But one has to pay attention to minorities as well as majorities—and, as someone said, if Mary Whitehouse did not exist we would probably have to invent her. She does represent a point of view, however widely or narrowly that view may be shared. There is also the difficulty—and I have personal experience of this—that her allegations, if not corrected on matters of fact, may be accepted by some people.

MR M. W. HILL (British Library Science Reference Library). Obviously the BBC, like the daily press, has to sift and select from the immense amount of news or information it receives. In this process much that ought to be communicated to small groups, those with specialized interests, must get lost. But Mr Rayner has mentioned plans for a growth in localized news services; since the BBC has an excellent reputation, in its Third Programme for example, for catering for minority interests, can we look forward to any growth of programmes (informative ones) for such specialized groups, for example, for librarians and information officers.

MR EDWARD RAYNER suggested that a fourth TV channel might function to satisfy the needs of any real minority audiences not currently receiving attention.

MR P. F. COLE (British Petroleum Company Limited). Are we to infer from Mr Rayner's answer to earlier questions that no steps have been taken to validate the BBC sampling procedure for audience counting?

MR EDWARD RAYNER. Steps are being taken. We are currently discussing the possibility of a joint experiment with ITV on audience research and validating statistics. At present our figures do bear a significant relationship to ITV figures—the audience divides 50:50.

MS R. PERRY (Institute of Criminology). Was it not the case that during the period of the former Stormont administration the BBC Northern Ireland service was far from being independent of Government direction and that the difficulties encountered by BBC staff were the subject of a Granada television programme?

MR EDWARD RAYNER. No. I don't accept that as a general proposition, although I think it is fair to say that for many years the BBC there did broadcast only such material as would emphasize what the two communities had in common. I'm talking of a period before I came into this job. And, of course, that's not been the policy in recent years (the period I was referring to in my paper) and I can assure you that these days we're heavily criticized from all sides, which isn't surprising in present circumstances. Indeed, it's something of a comfort, editorially, even if it seldom feels comfortable.

Information for industry: the research associations' role

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Paper presented at the 49th Aslib Annual Conference, Van Mildert College, Durham, 22nd–25th September 1975

THE NATION is in one of its worse crises for a long time and for this reason I intend to take a broad view of the role that research associations can play in helping industry rather than dwell overmuch on methodology of communication. If the present crisis is to be solved it will have to be through the products of industry. Industry is changing and is itself changed by the world situation oil recession. The balance between developed and developing countries may be changing.

Sociologists have pointed out the division between 'information rich' and 'information poor' nations (Figure 1, Table 1). To ensure that the nation is able to improve or at least maintain its position, it is necessary to invest in the future by apportioning part of the Gross National Product to research. Some would say that the only way for a nation such as ourselves to compete on the world markets is by being capital-intensive and using advanced technology. This is probably too simplistic but there is little doubt that we shall have to rely on our technology to a large extent if we are to maintain our standard of living. However, it is also undoubtedly true that our greatest failing has been in not *using existing knowledge* rather than any shortcomings in new R & D. The Bolton committee, in their report on small firms, came to this conclusion and it obviously has implications for everyone here. One of the problems is that of communicating to a wide range of firms from the multi-national giants to the one man and his cog effort. The research associations were created to provide co-operative research for this wide spectrum.

Development

The first research association was established in 1918 (Table 2) under the auspices of the old DSIR. By 1963 there were some fifty RAs, since when there has been a slight decline, mainly due to mergers. In 1970 there were forty-three, the largest having an income of about £1.7 million and the smallest less than £18,000. Income of the average RA was £382,000; 6,000 people were employed, an average of 138 each. It is likely that there will be further mergers in the near future as finance and product diversification dictates (Tables 3 and 4).

Aslib Proceedings 28 (2), February 1976, p. 84–95. Printed in Great Britain.

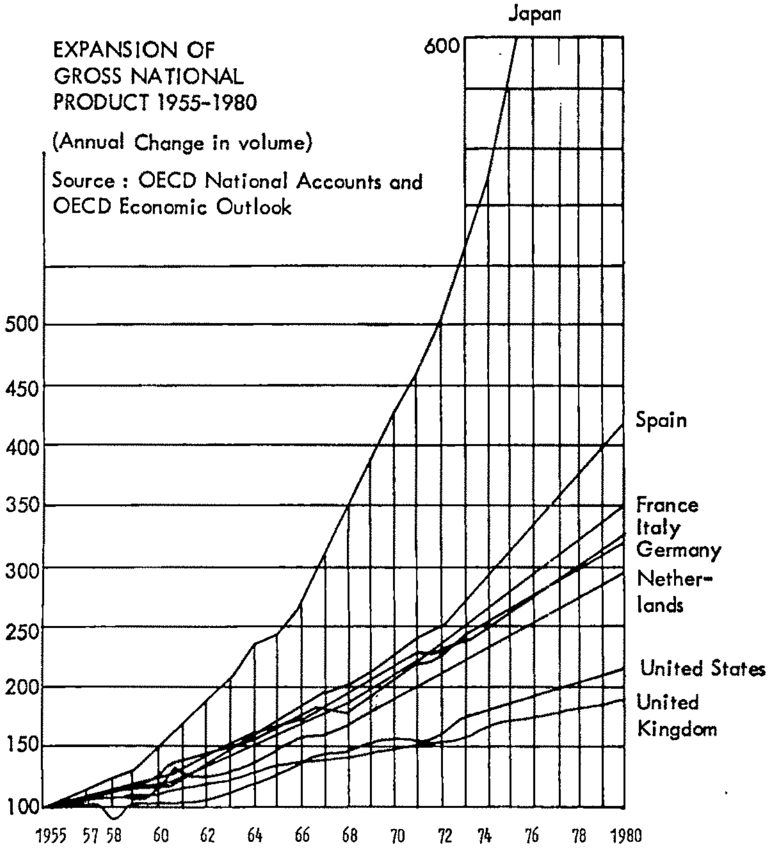

FIGURE I.

United Kingdom	1.68
France	2.43
Italy	1.75
Netherlands	2.59
Germany	2.46
USA	5.80
Japan	1.32

SOURCE: EEC Data.

TABLE I: *Productivity per man-hour in 1969*
(in US Dollars at current price and exchange rates)

Membership

The forty-three RAs in 1970 had almost 30,000 members of all categories. It was estimated (Hammond, 1967) that about sixty-eight per cent of all industry on a gross turnover basis was in membership of an RA. A significant development has been the growth in overseas membership. This was only permitted in 1962 (for non-Commonwealth manufacturers). In 1970 eight per cent of

Date established	*No. of RAs (1971)*
1918–25	14
1926–35	1
1936–43	0
1944–50	10
1951–60	9
1961–70	5
TOTAL	39

TABLE 2: *Date of establishment of RAs*

Number of employees	*No. of RAs*	*% Total employment*
0–50	5	2
51–100	12	15
101–150	7	16
151–200	7	24
201–300	3	13
301–500	3	20
501+	1	10
TOTAL	38	100 = 5,442

Average employment per RA = 143.
Average per RA for 39 RAs (separating Launderers and Dyers and Cleaners RA) = 139.

TABLE 3: *Number and distribution of employees*

	No.	*%*
Technical		
Degree	1,469	27
ONC/HNC	707	13
Technical assistants	1,034	19
Support		
Library	490	9
Administration	925	17
Other	817	15
TOTAL	5,442	100

TABLE 4: *Types of Employees*

members were from foreign organizations. SATRA was one of the first RAs to actively follow a policy of attracting foreign members. It is thought that the consequent strengthening of the RA more than offsets any loss of technological secrets across the straits of Dover (Table 5).

No. of members	*No. of RAs*	*% of RAs*	*% of total members*
0–100	5	13	2
101–250	11	29	7
251–500	5	13	8
501–750	7	18	22
751–1,000	4	11	18
1,001+	6	16	43
TOTAL	38	100	100

TABLE 5: *Distribution of RAs by size of membership*

Objectives

The Bessborough Report on the research associations found that the principal objective was that of servicing, maintaining and improving the well-being (specifically profits and efficiency) of their industries by providing technology-improvement, research consultancy, advisory and information services. *Cost effectiveness and industrial productivity were stressed as the real objectives.*

Finance

The various sources of income received by thirty-nine RAs in 1970–1 can be seen (Table 6). The trend has been a decline in grant earning income and a shift towards contract research and fee paid services. Following from the Rothschild recommendations, the principle of customer–contractor research was initiated and DTI Requirements Boards were set up in 1972. Under these,

Source	£	%
Government grant	3,959,636	24.2
Voluntary contributions (home)	3,677,900	22.4
Government and Industry contract work	3,586,749	21.9
Fees from services	1,424,140	8.7
Funding by trade association	1,267,085	7.7
Statutory levy	945,000	5.8
Voluntary contributions (overseas)	650,156	4.0
Other (not elsewhere specified)	356,451	2.2
Publications	302,975	1.8
Licensing fees	89,466	0.5
Sale of manufactured articles	64,579	0.4
Work for non-members	57,074	0.3
TOTAL	16,380,611	100

Average (mean) income per RA: £420,000.

TABLE 6: *Sources of income 1970/1 (amalgamated income pattern of 39 RAs)*

	No. of RAs	*% of RAs*	*% of total income*
£1 m.+	4	11	34
£500,000–£999,000	7	18	27
£250,000–£499,000	13	34	26
£100,000–£249,000	11	29	12
Under £100,000	3	8	1
TOTAL	38	100	100

Median income: £320,000.

TABLE 7: *Distribution of income*

grants are given for a specific project rather than the old style block grants (Table 7).

With regard to expenditure, the breakdown can be seen from Table 8. This table was compiled from responses from twenty RAs. Information services account for eleven per cent of expenditure, although this may include printing, publishing and translating.

Appraisal of the RAs

The Bessborough Committee was commissioned to look into the RAs and suggest ways of increasing industrial effectiveness by their own efforts. Its chief findings were that although relatively small sums (<0.2 per cent of net output in almost all industrial sectors) were spent on the RAs, they performed a role in the creation and application of industrial technology which is far out of proportion to their size and that their effect on non-science based industries is of great importance. In their judgment the money devoted to RAs had produced handsome benefits for the industry and the economy.

With regard to information, the report concluded that the skills of Aslib in the design and/or operation for RAs of information services have not so far

	A *RA expenditure on R & D* £m.	B *Total UK expenditure on R & D* £m.	A *as proportion of* B %	C *All UK industrial* R & D *expenditure* £m.	A *as proportion of* C %
1961/2	10.1	657.7	1.54	420.9	2.40
1964/5	12.0	771.4	1.56	503.5	2.38
1966/7	14.4	926.3	1.56	607.3	2.37
1967/8	13.0	962.1	1.35	624.4	2.08
1968/9	14.5	1016.6	1.43	657.4	2.21

TABLE 8: *Research Association Expenditure in perspective*

been properly utilized by the RAs as a whole. Aslib should devote special efforts to the promotion of new information systems for RAs.

With regard to 'Dissemination of information', the enquiry was not convinced that in all cases associations had found the most effective means of promotion of their work, that in some cases they were not making themselves known to a wide enough segment of their industries, and were content with an effective relationship with just a small proportion of their members. This type of condemnation will appear familiar to most people in the communications business. The solution suggested was to analyse members' awareness of and attitudes towards RA literature. A survey of this type was done at SATRA as part of a wider survey of members' needs.

Word of mouth communication was judged to be more effective than any literature (although surely depending on the situation), but normally much more expensive. The use of liaison officers who could be a type of salesman for the RA's work was recommended for this. The point here is that this type of development could be applied to information officers in communicating all information to their members. There is a need to sell information services as a positive service—a point which has been made before but which is rarely worked upon. What is needed is a definite plan to overcome this problem both by research into the effectiveness of communication systems and by including or giving greater prominence in the teaching curriculum to public relations, verbal communication, marketing and sales. We learn how to hide a book forever in a classification system but not how to convey its contents. The scientist is in a similar position. He has been regarded in the past as a somewhat secluded academic. In an age which puts far less credit on pure academic ability and in which research is subject to expenditure cuts when inflation rises, there is every reason for the scientist to communicate his work and justify the value of it. The scientist is becoming more commercially minded and adapting himself to the pace and market place of industry. The information officer must do the same by knowing his market, establishing his contacts and acting as information gatherer/journalist and *information giver*. He should attempt to communicate with all members as often as possible, acting as a type of liaison officer. He should concentrate on the reluctant users; perhaps trying different methods of communication—find out what strikes a receptive cord.

The end product of an RA is information—we are in the information business.

INFORMATION SERVICES

You will all be familiar with the type of material put into a special library and information service and many of the methods and techniques employed. What I intend to do is to indicate some of the more unusual or futuristic developments that are going on.

Computers

Their use in RA information services is increasing. Notable examples among others are RAPRA, and the Food RA. The Food RA in conjunction with Libra Information Services has developed CAIRS (Computer Assisted Information

Retrieval System). This is a mini-computer-based current and retrospective retrieval system which claims to make available computer systems to many small and medium sized information and library units.

Microforms

The Welding Institute has put its reports onto microfiche and PERA holds its trade literature on microforms. These are obvious applications with microform and computers—COM. There is still some reader resistance to microforms but it is useful where members (particularly those overseas) have the appropriate facilities, and it is good to see that Aslib is airing this subject in the near future.

Co-ordinate indexing

This is now a fairly common concept operating under varying degrees of sophistication, although there seems to be current thinking that the forms of added sophistication—links, roles, etc. are not worthwhile. It depends on one's priorities. Co-ordinate indexing may be used for 'Satellite' collections such as at PERA or as an alternative for the major retrieval system as at SATRA. The Aslib Co-ordinate Indexing Group bears witness to the acceptance of this technique.

Co-operation

Many RAs have formed links with their counterparts in other parts of the world, especially in the EEC. This gives the information services a chance to co-operate. SATRA and more recently BLMRA have been co-ordinating for five to six years with the Shoe and Leather Research Institutes in the EEC in setting up a Trilingual Thesaurus, and an exchange of abstracts based on this Thesaurus and Co-ordinate Indexing System. The objectives are to reduce duplication in indexing, abstracting and translations and to extend one's coverage and contacts. There are further plans to exchange information bulletins and other forms of co-operation. There are difficulties in ventures of this kind, such as different orientation and resources, but there will obviously be further scope as RA's aim to extend further their overseas membership and as links with EEC strengthen.

Another interesting example of co-operation is the production of World Textile Abstracts by which the Shirley Institute co-operates under the aegis of the Standing Consultative Conference on Textile Research with BLRA, HATRA and WIRA to produce the abstracts journal.

Dissemination of information

1. Abstracts journals are the main form of communication by RAs to their members (and in some cases non-members) although the Welding Institute, for instance, does not publish one. Most abstracts journals are extremely well known in their fields—*World Textile Abstracts*, *RAPRA Abstracts* and so on, and some are computer based. The type of abstracts depends on clientele—from more scientific type readers to more practical 'shop floor' people.
2. The next stage on from the abstracts journal is Selective Dissemination of

Information; examples here are Welda-search by WIRA comprising a family of systems from basic profile to a complete system with keywords and dual dictionary, RAPRA Rapid Information Services, Food RA, PERA, the Shirley Institute with STI (Specialized Textile Information) and TITUS (multi-lingual service), and so on.

3. Other forms of dissemination have been developed such as Newsletter type quick information services, for example WIRASCAN (fortnightly) British Ship-advance notices, RAPRA in Brief and SATRA Technical News Flash.

Other services

Some RA information services have extended their scope to include fringe services. These include provision of Slide lectures and films—FIRA and SATRA, Legislation services—Food RA, Translations—TITUS (Shirley Institute), and cover to cover translations of European journals which may be subsidized by OSTI—such as RAPRA 'International Science and Technology', Machine Tool RA—'Production Technology' and British Cast Iron RA—'Russian Castings Production'.

Some RAs are now offering a service on statistics and marketing. Almost all RAs would say that this field has the fastest growth rate for enquiries. There seems to be scope for offering consulting services and reviews of the world scene for particular products. Another industry development is the success of RAPRA in gaining contracts with the Rubber Division of The American Chemical Society and UNIDO to supply them with information in the rubber and plastics fields.

This has been a rather brief coverage of some of the more unusual developments. We now come to the most important part of this paper—what is going to happen in the next five to ten years. Do we yet know what developments will take place in the information world and when, and what developments will take place in the world of industry which may affect information services? It is tremendously difficult to pinpoint actual developments with any great certainty but the actual action of thinking about this and making plans is salutary. In this part of the paper I am attempting to foresee what developments will happen which will affect RAs and their information services.

Industry

What developments can we reasonably expect here in the next five to ten years? The main determinants are likely to be world trading patterns, inflation, oil and living standards. As developing countries develop their resources, trade patterns are obviously altered. There will be opportunities to export more to these nations. Inflation, although becoming catastrophic in the UK at the moment, has never persisted at really high levels in any country for more than two to three years as a rule. I hope the UK is not the exception to the rule. Our oil resources are expected to help in the balance of payments. Our living standards are becoming more geared to the concept of waste-avoidance and self-reliance. What is needed, above all, as the Hudson Institute Report pointed out, is a major change in attitude and structure with six-year planning (to avoid political football), creation of a National Administration College, control on outflow of capital and a reform of education as Crowther Hunt advocated to produce more scientists and technologists. This is possibly the last time we shall have the chance for a major re-think of our priorities for a long time to come. Given these conditions or type of conditions, we are likely to see changes in the structure of the economy, investment, manpower, consumer spending, and also research (Table 9).

Investment

This has been at a low level due partly to 'stop-go' policies of the governments in the last few years. There is a great need for higher investment—the NEB possibly may help. Above all a long term plan is needed, tied to a policy of research to ensure this investment is well spent.

		Supply	
	*Demand**	*Optimistic*	*Pessimistic*
1975	750	36	36
1980	950	1,000	840
1985	1,200	1,800	840

*Estimate.

SOURCE: *Production and reserves of oil and gas in the United Kingdom*, Department of Energy, HMSO, London 1974.

TABLE 9: *British oil demand and local supply 1975–85 (millions of barrels per year)*

Manpower

Government legislation on industrial relations, worker participation, and conditions of work is inevitable, meaning the creation of a new 'industry' related to manpower resources to which our information services should gear themselves. Manpower is one of our greatest assets. Reduction in hours worked and increased automation will mean that further research on how time is spent will be needed. Education and training will need to be more sophisticated in their output to match needs.

Government control

With further government intervention in company affairs, general direction of the economy, and worker legislation, coupled with EEC regulations, there will be an opportunity for information services to act as interpreter for their members and a badly needed interpretation in many industries. This is vital.

Consumer spending

As standards of living are likely to be reduced for a few years at least, so the industries will be looking to their RAs to gear their products more to the consumer and research more into the consumer needs.

Research

How is all this going to affect research? On the one hand belts will be tightened as spending is cut. On the other there is an essential need for investment and research. Without our technology a gloomy picture would be painted. It is the application of research that we must concentrate on—the customer–contractor principle represents a step forward as long as it is not applied too stupidly. The Chief Scientist Sir Ieuen Maddock has said that the UK should be devoting a greater percentage of R & D resources to relatively unglamorous activities from which most of its earnings come. Britain has been spending a higher percentage of its GNP on R & D than any other nation of comparable size. So perhaps there will be a shift to these 'bread and butter' projects. RAs having strong links with this type of industry should be able to contribute even more, especially in the utilization of existing knowledge. What part will information services play in all this?

The role of information services

i. National–international network

As new markets open up and research becomes more international, so information services must be able to accommodate to this. UK RAs are in a good position to serve or improve on their international markets. Arrangements must be made to improve international input. On the national level, outside services will probably have to be used more for input leaving the information officer more time to liaise. On the methodology side Aslib is the natural coordinator but will need to liaise and plan closely with the RAs providing different methodologies for all different types, not only for the 'computer' boys.

ii. Mechanics

Even in ten years' time it is doubtful if all information services will have computers and microforms because of consumer resistance even if the cost eventually becomes feasible. Can we expect any other developments? Is anyone in the information field working on any new form of media? A total resource inventory for the UK would show astonishing results in the mountainous use of paper and terrifying duplication of effort. Is there any hope of avoiding duplication by reference to a plug-in data base of keyworded abstracts. Panels of overall industry journals could vet proposed works for duplication. These things are unlikely to happen but we should be looking into them, or know that someone is looking into them.

iii. Clientele

Even assuming the clientele of the RA remains virtually the same mix of scientists, professionals, economists, salesmen, shop floor, management, etc., the greatest scope for improvement in information services in the next five to ten years lies in the field of communication. This is our business and also our greatest weakness. We are serving in almost all cases only a small proportion of our potential customers. How does this tie in with the objectives of the organization? It is a problem we all realize, but what is the solution? Can we learn anything from other professions or trades where a similar situation exists; why are such a high percentage of firms not interested in our product? Even if our clients do not like reading they must still have some use for a service that actually cuts down that reading for them. As a vague preliminary it is surely necessary that we establish what it is they actually want, act as a liaison officer, positively go out and get on personal terms, try to establish a two-way communication system. Like a journalist, stocktake on what information is being taken out, look at education techniques to teach the consumer to look on information as a very cheap (to them) but very profitable aid.

On a general level the image of the information officer should be improved as this would help in communicating with our clients. The research worker has improved his image from being a recluse to being more dynamic and commercially minded. The information officer must do the same by establishing a place for himself in the 'market place' as information expert and link with industry.

iv. Costing

In the present environment of spending cuts it is more essential than ever that information services should be able to quote their costs and quantify their benefits both in their individual services and on a national basis.

v. Range of services

It is highly likely that due to spending cuts and publishing difficulties, there will eventually be a decrease or declining growth rate in input (where most effort is involved) allowing more effort to be put in output where it is needed. There is likely to be a trend to the provision of fringe services such as statistics, legislation, audio visual methods and that the information officer will be increasingly concerned with interpreting his data.

Conclusions

This paper has skimmed over the surface as a broad brief was deliberately taken to show that information services cannot exist in isolation, especially today. Like all lectures it has surely been a waste of time if it does not stimulate any thought or more especially any action. I suggest that the following recommendations should be considered:

i. RA information officers

Set up a working party with Aslib to consider the following: investigation into liaison with members—effectiveness of it, *e.g.* run suitable courses, press for inclusion in curricula of techniques of market research, education, salesmanship, journalism and public relations, where appropriate, in conjunction with these professions; the corporate use of record computers to allow a more effective output.

ii. Aslib

To assist and advise in these objectives:

To look into new forms of media and total resource planning.
To formulate a policy for a national/international network for RAs.
To formulate a policy for improving the public image of RA work.
To communicate results of research in short form as well as lengthy documents.

(Indeed a working party is shortly to be set up to put this into action under the umbrella of the Committee of Directors of Research Associations.)

INNOVATION—OF THE SORT THE RAs PROVIDE IS VITAL TO THE BRITISH INDUSTRY—IT IS A VITAL NATIONAL ASSET—LET US SELL IT—LET US USE IT.

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DISCUSSION

LIZ ORNA (Engineering Industry Training Board) asked if Prof. Payne would agree that if information services are to maximize the exploitation of information then they must be as close as possible to the policy-making centres of their own organizations.

PROF. PAYNE agreed with this principle and stated that the research associations themselves should act as information services not only to their industry but also to the Government.

DR D. J. CAMPBELL stated that a prime difficulty in information work is not only knowing the costs but also proving the benefits, particularly as the latter can usually only be shown in isolated instances. Dr Campbell asked if Prof. Payne had any techniques to demonstrate the benefits.

PROF. PAYNE explained how the effectiveness of information services could be monitored by questionnaires.

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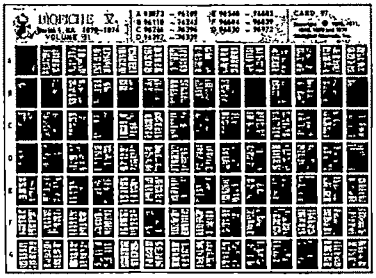

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Role of information in planning industrial investment

I. D. McDonald

National Economic Development Office

Paper presented at the 49th Aslib Annual Conference, Van Mildert College, Durham 22nd–25th September 1975

I WOULD LIKE to divide my comments into two parts. The first is the information related to investment planning within the company itself; the second is the information relating to the total economic environment in which the company is operating. In making an investment plan, these two types of information are very closely linked, and most investment decisions are in fact dependent on both.

Objectives

But before talking about the information requirements, we must first consider what are the objectives of the investment we are seeking to plan. Obviously the information we will be requiring will be related to those objectives.

To say that the purpose of investment is to make profit is an over simplification. This may well be the popular conception of the purpose of investment and there is of course some truth in it, but we have only to think of such important national objectives as the provision of jobs, the need for an efficient and up to date industrial sector and the contribution which investment makes to economic growth, to realize that profitability is but one aspect of the subject. Indeed when we think of the nationalized industries themselves it is at once apparent that profitability is less important than the maintenance of basic industries and the provision of essential goods.

This multiplicity of objectives also exists in the private sector. Profit, or to be more precise a return on capital employed, will certainly be one of the objectives since this is the reward necessary to attract risk capital without which private enterprise could not continue. It is likely though that it will only be one of a number of commercial objectives; others will include the attainment of a certain market share for the company's products, the maintenance of technological proficiency, or the need to keep pace with competitors' developments. The commercial undertaking, therefore, has a variety of objectives and the financial return on the investment itself may at times be subsidiary to others, yet it will represent a standard of performance without which the company could not afford to make the investment itself. How then does a company go about this investment planning process and what is the information which it requires in doing so?

Aslib Proceedings 28 (2), February 1976, p. 96–101. Printed in Great Britain.

Company investment planning

Investment planning goes under a variety of names and guises. Some companies develop formal corporate plans setting out medium-term objectives, the means of achieving those objectives and the criteria to be adopted in making the necessary investment. Others might call this management by objectives, while others develop investment strategies or policies without formal relationship to any overall plan. There are many names and a variety of techniques. What they all boil down to is some means of assessing how a company should invest its money and what it hopes to achieve as a result of that investment. In going through this process a company will take into account most, or perhaps even all, of the following subjects about which information will be required:

(*a*) *Markets*

A view will be needed of the future markets for the product the investment will produce; changes in consumer expenditure patterns will be taken into account, as also must changes in taste; the possibility of new products must be considered and the range of products with which the company deals.

(*b*) *Technological factors*

The type of investment to be made must be carefully analysed. Technological change is likely to have rendered existing investments obsolete and the anticipated life of the new investment must be assessed. New processes, both in the production of the product itself and the use to which the product is put by the company's customers are equally important.

(*c*) *Financial factors*

A calculation must be made comparing the income which the investment is likely to generate with the costs involved in producing it, in order to ensure that a net income can be earned capable of recovering the cost of the investment and making a satisfactory return on it.

(*d*) *Organizational factors*

A new investment may be part of a reorganization within a company with a view to improving its efficiency. This might be on the factory floor if new machines are to be installed. It might be on the company's whole structure by horizontal or vertical integration to achieve economies of scale or improvement in efficiency in processing or marketing.

(*e*) *Personnel policies*

Linked with organizational factors must be the appropriate policies for employing a work force of the right size and appropriate skills. Manpower plans must be made for redeploying and retraining employees if necessary.

(*f*) *Competition*

An assessment must be made of the product's eventual ability to compete in the market. This indeed might have been the starting point for the investment itself in order to preserve or expand the company's existing position.

The combination of these factors will determine the investment which the company makes. They will not all apply in all cases, but some, such as the ability to sell the eventual product and the need to earn the return sufficient to service the capital involved, will be essential to successful investment.

Most companies have established standard procedures of investment appraisal whereby these factors are examined in relation to any proposed investment and an assessment made of its attractiveness in achieving the company's objectives. This analysis is a complex process calling for highly developed management skills. It requires professional expertise, experience, and information relating to the topics mentioned. Most of this information is fairly readily available to companies. Much of it, for example details of their own operating costs, is already available as a result of their existing activities. Most of the rest can be found from published or privately available sources, such as the information supplied by professional or trade organizations, or from commercial undertakings such as Market Research Consultants. We in NEDO like to feel that we make a contribution here and I hope that you find useful our publications on marketing, financial and investment topics in certain industries.

Information sources for investment planning within the company itself are therefore fairly good. Information is available or the means can be found to make it available. But the usefulness of information—and the use we make of that information—is constantly changing and it is worth considering some of the factors I have mentioned in the light of conditions prevailing today. This is particularly so with regard to markets, manpower and finance.

British industry has been well served with information on the UK domestic market. The market researchers have laid the retail market bare; we have surveyed consumer attitudes so well that we can watch them change as we introduce new products through TV commercials. Yet with all this information on the domestic market we seem to have forgotten the international one. Our domestic market today is not Tyne Tees television coverage but the nine countries of the Common Market. Nor should we stop short at Europe. Trading success depends more and more on gearing production to world markets. Its importance lies not only in selling the right products, but in facing competition which is organized in world terms. Experience in our motor cycle industry has recently shown us how the failure to understand international markets and competition has resulted not only in the loss of the overseas sales, but of the domestic one as well. We have of course many multinational companies with a very complete understanding of world markets. A great part of British industry, however, still seems to think of competition in terms of the firm next door or 'down in Slough' rather than the producer from the Far East, or the developing countries of the world. Information services would be making a valuable contribution to industrial development if they could begin classifying the domestic market as being the Common Market and demonstrating its relationship to world markets as a whole.

Manpower planning has for too long been the poor relation of investment planning. Perhaps there are traditional reasons for this; perhaps management has been so preoccupied with the financial pressures and market competition that manpower was neglected. Little purpose is served in examining the reasons now. What is apparent is that investment planning which is not linked to manpower planning can run into major difficulties. We are all aware of major building sites on which work came to a stop (and here the NEDO work on large sites played a valuable part in changing the situation), of factories producing for exports standing idle, and of orders that are lost through an inability to quote delivery dates. It is often glibly said that capital investment should be made to reduce labour costs; that we should develop capital intensive activities rather than labour intensive ones. The economic arguments behind this are sound, but such schemes can only be put into practice if the implications for manpower receive as much attention as financial aspects. Nor should we see this problem simply in the light of improving industrial relations—of explaining to men how their work will change or how they might be redeployed—we also need to ensure that we have adequate numbers of skilled men available for the new work brought about by the investment. The recent expansion of activity created by the North Sea Oil boom is a clear example of new investment projects suffering from shortage of men to carry out the work.

In spite of all the study which has gone into the financial aspects of investment this still remains a subject on which much more needs to be done. In spite of the way in which many companies have developed methods of investment appraisal and in spite of all that has been written on techniques such as break-even analysis, discounted cash flow and, more recently, risk analysis, investment is still too often a haphazard process. We know from our discussions with a wide range of companies that many do not relate individual investment projects to any overall plan, relying only on the likely achievement of a 'target' rate of return and in many cases simply applying traditional rule of thumb methods like a five year pay back period. More importantly traditional methods are inadequate in dealing with the problem of inflation. Investment appraisal based on historic cost accounting values does not assess the return on capital after taking inflation into account. What may appear to be a satisfactory return at the outset may become inadequate as the value of money declines. This can result in the failure to earn sufficient cash to replace the asset at the end of its effective life when, as a result of inflation, replacement costs are higher. Investment techniques must therefore be developed which take inflation into account by relating the rate of return to the replacement cost of the asset, the pricing of the product produced and the cash flow generated by sales.

The economic environment

There is much information available for investment planning within a company and ways can be seen as to how the information itself and its use can be improved. It would be wrong though to suggest that successful investment depends simply on matters which are within a company's own control. It depends equally of course on the economic environment in which the company is operating and investment plans must take this into account. This is much more difficult. It does not take too much imagination to realize that even if a company had carefully gone through all of the factors set out above, its plans could be thwarted by factors which are apparently outside its own control. We have only to think of our present economic difficulties to recognize how vulnerable individual company plans can be. No matter how well informed a company is over its own affairs these can be totally overshadowed by changes in the economy generally, by such matters as the price of oil, inflation, world trade, etc.

Let us look at the problem of inflation to which I have already referred in the context of investment appraisal. My earlier point was that inflation affects the earnings from an investment and the cost of replacing it. Its effects, however, are far wider than this and one of the difficulties facing us is that their full range is not understood. It is clear though that inflation changes not only the cost of investment but the cost of operating that investment as well. Wages will rise and the cost of materials used in producing the goods for which the investment has been made will change. These operating cost changes will alter the expected rate of return or have to be passed on in higher prices. The higher prices may affect the level of demand for the product and a smaller volume of business might therefore be done. We can see how price changes can affect consumer demand by looking at the decline in motoring and car sales resulting from increases in the cost of petrol. Changes in price levels through inflation will have the same effect, making some products less attractive than others.

Of major importance too, is the impact of inflation on the economy generally. Simultaneously with inflation we have begun to witness significant changes in the rate of economic growth in this country. Unfortunately, this is reflected in similar changes in other major countries which in turn affects world trade. The implications of this in terms of markets for a company's products are difficult to assess. A supplier of equipment for North Sea Oil development will fare differently from a producer of consumer durables. Both, however, might be influenced by national economic problems associated, for example, with the balance of trade.

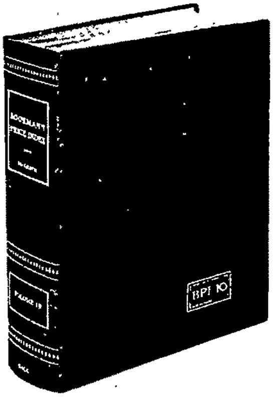
It is hardly surprising that in the face of these forces businessmen are showing a lack of confidence and that investment prospects are regarded as poor. The CBI surveys of investment intentions and the views of professional forecasters all reflect the declining trend in investment and the lack of confidence by businessmen. It is far from clear as to how this position can be reversed.

If boards of directors, advised by specialists in finance and economics, find the present situation complex the man in the street feels completely baffled. How else can he react to higher prices than by seeking to compensate for them by increases in wages? When companies cannot sort out the relationship between investment, costs, prices and profits how can we expect the man in the street to see the necessary increase in his own income as part of a chain reaction through costs, prices, investment and perhaps his own job? Indeed quite apart from our present complaints, the average person has but a sketchy understanding of how the process of investment takes place. He has a still less clear view of the role of profits. Recent surveys carried out for *The Times* and the CBI have demonstrated this lack of understanding. Many people thought that profits were simply shared among the directors. The need to pay a return on the capital employed and to reward shareholders with a level of profitability commensurate with the risk involved is even less well understood.

Our inability to arrive at a rational solution to these issues has led, of course, to the current national policies on incomes and prices. By themselves these will not solve the problem and will even give rise to additional anomolies and distortions which may complicate investment decisions further. However they do provide us with a breathing space to prepare more constructive policies for the future. We are dealing here with the latest in a series of attempts to improve our national economic performance. Since the war this country has not been able to achieve the rates of growth of comparable but more vigorous economies in other major countries. It is accepted that changes are needed to correct this situation. The anti-inflation policy is a step in that direction but, in itself, will not provide the regeneration of industry which is required.

The changing of the economic climate requires a greater understanding by all of us of the issues involved. Information has a vital part to play here. At the moment our papers are full of economic crisis but we are strong on opinions and weak on facts. Within the National Economic Development Office the greater part of our time is spent in trying to unravel the facts which bedevil the relationships between Government, management and unions. Many of you will know of the work of our Little NEDDIES which attempts to build an understanding between the three parties of the ways in which industries should develop. Earlier this year we carried out for the Council a major survey of Finance for Investment demonstrating the shortage and high cost of money for industrial investment. Recently, too, some of our industry committees have been working on schemes to provide funds for investment under the Industry Act. Such actions can contribute to the better understanding that is required. No doubt you will have read in the press of the proposals to prepare this autumn a new industrial strategy based on agreement by the three parties to the NEDDY Council. Such a strategy should provide the basis for an understanding on where and how industrial investment should be made.

This understanding, however, must be shared by the whole of industry, and not simply by the few individuals who participate in national discussions. As a nation, each one of us needs to understand more fully the connection between national problems and our everyday work; for example, that investment is not simply directed towards earning a profit, but is essential to our economic strength. Management needs to understand the implications of investment on the people who work in companies. They need to see it in terms of the stability of jobs and the wage earning that goes with them. Trade Unions need to understand the financial constraints within which companies make investments and the contribution which work people have to make in order to ensure that such investments are used effectively. Government and politicians need to appreciate the complexity of the industrial process and, whenever possible, provide stability in industrial policies. All these matters are the appropriate concern of the information services.



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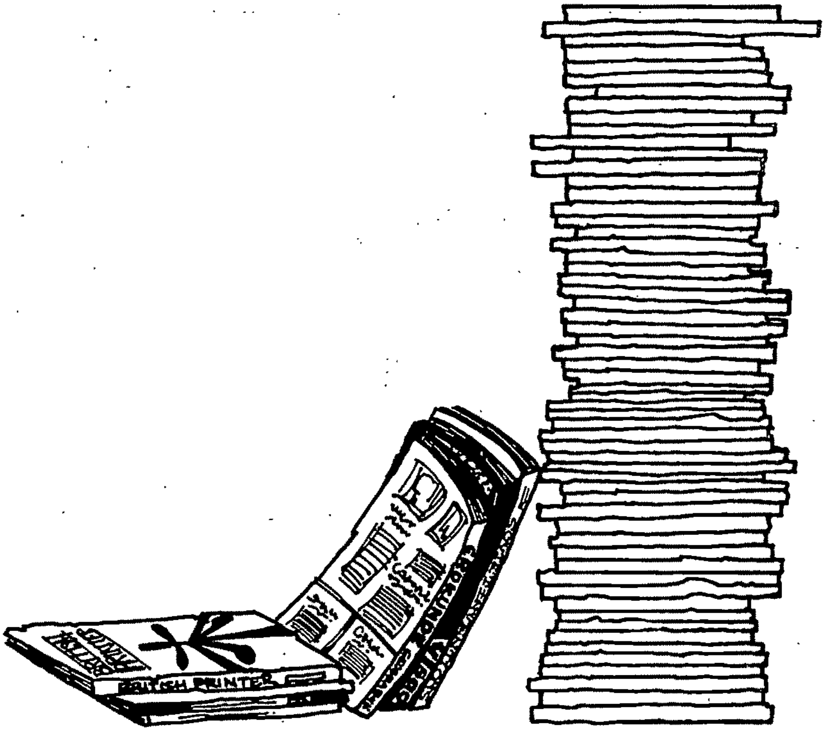

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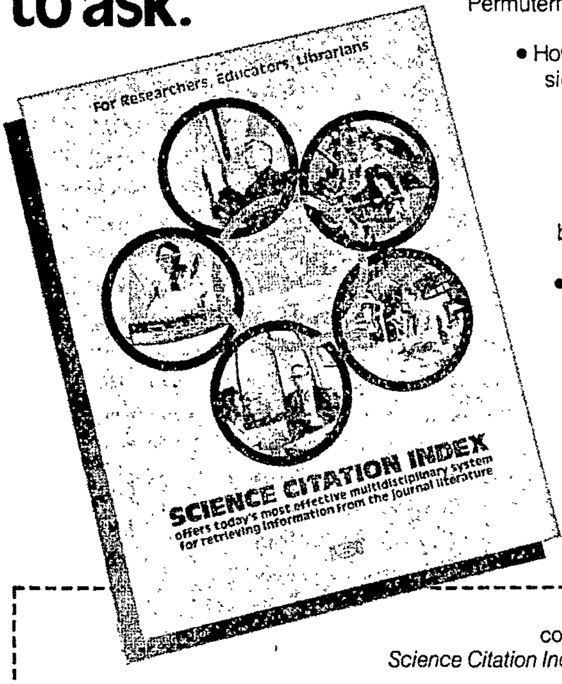
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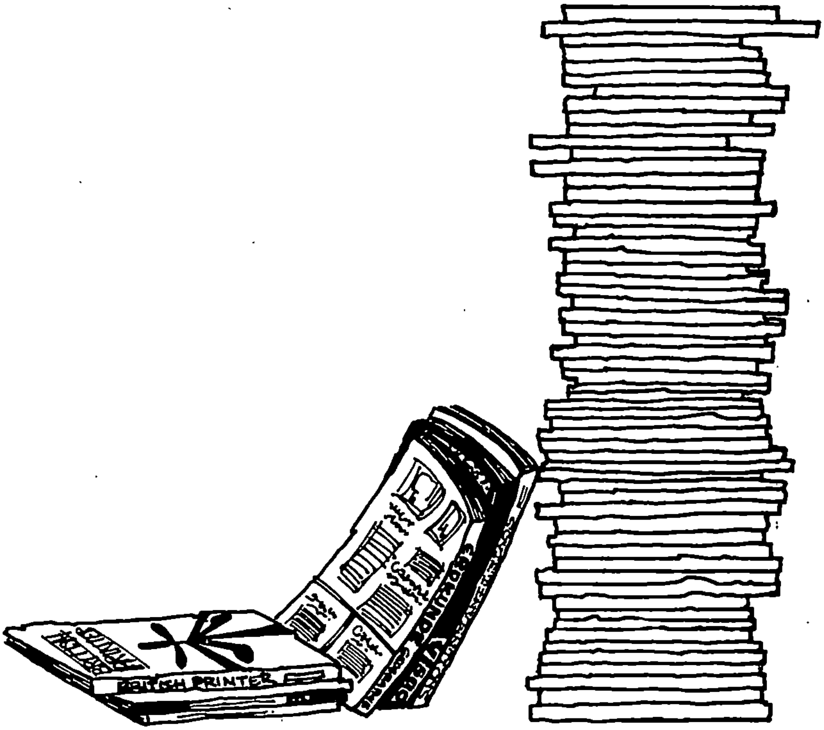

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Science at the hinge of history

Magnus Pyke
British Association for the Advancement of Science

Paper presented as the 9th Aslib Annual Lecture, The Royal Institution, London, 14th June 1976

HOW HAPPY WE ARE to be able to live a comfortable, warm, wealthy life in the modern age of today. Grateful to science we may not be but just the same we know, if we ever stop to think—which we seldom do—that we ought to be. Spinsters no longer have to spend hour after hour spinning to make the thread to weave the sheets we sleep between. As a matter of fact, no one has to labour in the boggy fields to grow flax any more to produce the linen which, once upon a time, had to be grown before even those few rich people who could afford linen sheets could have them. As it happens, making linen is a disagreeable smelly business. The flax has to be cut down and left to rot in the fields so that the fibres can be beaten out of it. This rotting process—so called, wretting—is probably the second most disgusting process of the pre-scientific age, exceeded in disagreeability only by the tanning of leather in which the hides have to be soaked for weeks in a slush of dog manure which, strangely, is the richest source of the particular enzyme which most effectively softens the skins. Those whose fortune it once was to live down-wind of a tannery can confirm the primacy of its potent effect on what once was called the atmosphere, now known as environment.

And if the once prized linen sheets were superseded by cotton ones, cheaply available for our lucky ancestors from the labours of slaves in cotton plantations, even these imposed a burden on washerwomen—and they needed ironing as well. Beautiful, smooth nylon sheets need none of this. And if we still sleep in cotton sheets, flat-irons no longer have to be heated on the fire, one left on the hot coals while the other—cooling all the time—was in use, to be slipped out of its metal shoe and exchanged every few minutes. Today, in these clever, happy times, an iron, of course, means nothing else than an electric one. And electricity is piped in as a matter of course to every house, just as sewage is pumped out. Poor unfortunate Pepys, back in those barbarous days of Charles II (when Isaac Newton, the greatest scientist England—or perhaps the world—ever produced, first grasped what kind of universe it is we live in), had his whole basement flooded with ordure from the overflow of his next-door neighbour's cess pool.

What a wonderful piece of work is a sewage farm! How often do we, the inheritors of so much scientific skill and effort, exclaim in the fullness of our hearts as we set the mechanism in motion. 'Go to the ant, thou sluggard', abjured the Victorian moralist to his pupil. What better could the modern

Aslib Proceedings, 28 (8), August 1976, p. 256–265. Printed in Great Britain.

teacher prescribe than a visit to a sewage disposal plant to any one in search, not only of scientific enlightenment, not only of a way to express gratitude for all the great benefits of science, but also for moral enlightenment and a way to live in peace among the complex stresses of a crowded world.

To the sewage works come the undigested fragments of the fruits of the earth, crumbs, it could be said, from the rich man's table. Mingled with them are the bodies of dead creatures, the micro-organisms which we all carry around in our guts, to live with us and serve us, make us vitamins and chew up something of what we cannot effectively chew. Then when we are done with them, we throw them out to die. Down the pipe they go to where, on a specially constructed waterfall, made of plastic honeycomb today where once was a circular castle of coke, the juices of sewage serve as a medium for a complex mixed community of bacteria. One nation of these consumes one component of the brew and another another. These nations live together in harmony, if the sewage-works operator knows his science. But not only are there nations of bacteria, there are larger creatures as well. Things that wriggle and paddle themselves along (under the microscope, of course) with rows of 'oars'. There are larvae, too, which in due time turn into insects and fly away.

I once had a colleague, Bob McGaw, a microbiologist, (he's dead now, poor chap) who was researching into the biology of effluent-disposal plants (sewage works to you). Peering down his microscope, he observed the little bacteria and the not-so-little protozoa rowing themselves busily about. All at once, his eye peering down through the eye-piece, he saw, looking up at him, another eye. Within the single span of a trickling filter-bed in a sewage works we have a dramatic model of what one day might be a harmonious world where the lion and the lamb would not only be lying down together but would be working together and—best of all—working together for the benefit of man and as a living parable by which that same man might usefully guide his own behaviour. There, all together on Bob McGaw's microscope stage, were bacteria and protozoa, larvae and flying insects all single-mindedly, while going about their own business, serving to use, break up and hence dispose of the wastes of urban man. It was almost as if the creature looking up from below was nodding its head at the man looking down from above to congratulate him on having, through his scientific understanding, so arranged affairs that the London of the twentieth century should be more civilized than the London of the seventeenth century.

Every aspect of today's delightful life bears witness to the debt of gratitude we owe to science. Coming down to breakfast, no longer do we need first of all to clean out the grate, lay the fire with dry sticks and set the kettle on to boil. As a child, I remember just this being required. The wonder of those fat towering structures we all (incorrectly) called gasometers, by which every town of any pretensions to up-to-datedness was dominated was yet to come. Today, the giant Gothic—if slightly rusting—erections have lived their brief lives and gone as further advances in applied science allowing gas to be distributed at high pressure have taken their place. And who is there so lacking in imagination as not to feel a sense of wonder each time he turns the tap to think that the secret, potent, invisible vapour by which the bacon is being fried has come from the deserts of Algeria on the borders of the Sahara or from the depths of the sea. Who would have conceived that the dry scholars in knickerbockers—figures of fun, scrambling about the countryside with little hammers collecting samples of rock—would so have developed the dilettante science of geology that, by a bold amalgam of thinking and adventurous exploration, the subterranean stores of fuel we use each day would be discovered?

It is said of Caesar Augustus that when he arrived in Rome it was a city of brick and when he left it was a city of marble. Modern citizens everywhere in the industrial world live in cities of marble—or at least, if not of marble, in the next best thing—concrete—hard, white, durable, strong, far easier and quicker to erect than stone, infinitely malleable and far more versatile than anything available to Caesar Augustus. Not only can we construct our buildings from this material—the product of chemical knowledge and understanding, of crystallography and rare insight into molecular structure—but the roads of the day, the great motorways linking together all the cities of the land can be made from it as well. The misery of our ancestors is perpetually to be found recorded in their writings. The Romans with infinite labour constructed some few military arteries across the countryside. For the most part, however, those not so favoured as we are nor fortunate enough to live in a technological age had to put up with the mud of winter and the rutted dust of summer. Indeed, even in the favoured twentieth century, the majority of mankind, to whom poverty, remoteness or war has denied the blessings of science—in South America, Asia and Africa—are still plagued by the arduous labours of travel, having neither the knowledge of how to prepare concrete, the raw materials, the equipment and fuel needed in its manufacture, nor the great earth moving and mixing machines without which road building is of almost all human endeavour the most laborious. For us, the happy few, it is into the car and away.

We modern people who through the blessings of science enjoy the privileges of mobility show by our actions how deeply we value it. Mobility allows us to leave the areas of the towns where we work and live far away from the factories and counting-houses where the business of earning our living is done. There is no compulsion on us to do this but both as individuals who opt to live away from where our work is done and as communities who, through the local authorities whose duty it is to be our corporate voice, decree that factories *shall* be at a distance from the dwelling houses, we take advantage of the gift of science and the technology springing from it, to *commute,* as we quaintly put it, miles away from home each morning and back again to the place we started from every evening.

The thirst to enjoy the blessings of the petrol engine, which through the ceaseless drive of research becomes more powerful and sophisticated each year, is most dramatically exemplified in our pleasures. Before the age of science and technology ordinary working people perforce stayed at home. On feast days they could enjoy the fair on the common, take part in the great spectacles of the church which, progressing first through the miracle plays illustrating the stories of the Bible, evolved in due time into the theatre, or indulge in the conversation of the ale house. If he was rich, a young man could only hope once in his life to indulge for pleasure in foreign travel if his father was able to send him and his tutor on the Grand Tour to complete his education. But today, as the benefits of science grow and become more widely diffused among all the members of the community, the day trip to Margate or, as the Glaswegians used to say of the steam-boat trip out into the estuary of the River Clyde, 'Doon the Watter', has extended beyond the week away from home at Blackpool or Bognor until, in an age when the intellectual achievement of flying has become a commonplace, no member of the community is denied the enjoyment of travelling—300 at a time at 400 miles an hour—from Great Britain to Spain, there to be housed in system-built dwellings, fed, amused and returned to Great Britain with equal economy. Nor does the thousand-mile journey, which would have involved their ancestors in months of planning, trouble, some danger and substantial expenditure cause them any effort at all. Through the blessings of applied science they need only wish and the journey is accomplished with little more activity on the part of the traveller than if he or she had been an inanimate parcel. Indeed, so complete a mastery over distance has science provided that people who are old and poor can be supported in their poverty just as conveniently and economically in an out-of-season hotel in Spain as in their own houses in Torquay. The plane journey there and back is a bonus the richness of the times can easily supply.

Whether or not an urge towards locomotion is one of the built-in psychological desires of man as a species, it is clear that once the freedom to travel about at speed provided by science becomes available to a modern community, the members of such a community immediately exercise, as almost their most highly prized desire, this freedom. A number of philosophers have attempted to identify what seems to them to be the basic human motives. Life, liberty and the pursuit of happiness have served in America for two hundred years and can continue to serve still even though both liberty and the pursuit of happiness are vague terms which do not explicitly comprise what millions of people show by their actions *they* would expect them to include, namely the right to drive up and down in a motor-car. Be that as it may, all modern states in which science is well developed as a branch of public knowledge and is applied in the manufacturing industries of the nation so arrange their affairs as to produce as many motor-cars as they can for the enjoyment of the citizenry. Loosely administered countries such as the United States pride themselves on the fecundity of their automobile manufacture. Rigidly ruled nations such as Nazi Germany held the production of huge numbers of Volkswagen—the people's car—as their highest achievement. Newly industrialized nations such as Japan measure their advance towards success and happiness in terms of the increasing numbers they succeed in making. Countries in economic distress such as Great Britain contemplate with some measure of resignation the decay of their basic industries and the dismissal of their workers before they would abandon their capacity to produce automobiles. Veritably, the truth of the aphorism 'what is good for General Motors is good for the USA' transcends national boundaries and changing political attitudes. And of all articles in popular use in the modern age, the motor-car illustrates most vividly the direct relationship between the advancement of science and the increase in human happiness. Each year as the new models come out, the lights are brighter, the engine more efficient, the upholstery more durable and beautiful, the paintwork more delightful, the rear windscreen more subtly heated. And each of these is an added joy to the motor-car's owner.

Then there is the telephone, that splendid engine of human togetherness. How can one avoid becoming lyrical at the thought of what it makes possible. Should a man's car break down on the motorway, there at convenient intervals are telephones through which his call for assistance can be heard by those waiting to help him. How, we may well ask, could our ancestors have endured existence when their only means of asking a man from the next town to dinner was to send a message to him by a servant on a horse? By what miraculous means could the young men of an earlier age indulge—as literature tells us they did—their taste for women deprived as they were by the backwardness of the times of any possibility of asking each new-met friend for her telephone number? How could business be transacted, bets placed, taxis called, burglaries reported to the police without telephones?

We have lived in an age of giants undreamt of by our predecessors. We are the first generation of mankind to have succeeded in stretching by our scientific capability the art of gunnery to the point when a projectile has been fired up so high into the sky that it has never come back. Above our heads it swings round the earth as it turns, like a conker on a string swung by a boy. We have put up several of these metal projectiles so delicately aimed that one hovers for ever over the Atlantic, another over the Pacific. Historians writing of the achievements of this splendid generation—how can we fail to delight in our godlike powers?—who put up the first satellites, tiny moons all our own. Nor are they sterile and crumbling like the old worn-out moon God put in the sky before we were born. Each of ours carries a telephone exchange so that we can dial straight through from Tottenham to Tokyo and find out what is happening on the Japanese stock exchange.

As we follow modern man through the delights of his day, the prizes won by modern science and the practical processes built on to it—few more than a hundred years old and many of them less than fifty—are apparent on every side. The chemical industry of the nineteenth century made nations rich, to be sure. Yet the great successes—for example, means for making bleaching powder or sulphuric acid—did not much affect the quality of life, unless it was to make those parts of the town where the labouring classes lived smelly. The hearts of the ordinary people do not beat faster nor are their cheeks flushed and their step more buoyant at the thought that a new and improved process for the production of sulphuric acid has been developed. One has to be an economist, a business man or a chemist to know what sulphuric acid is needed for even though there is a general misty understanding that, somehow or other, the prosperity and wealth of a nation can be measured in terms of the tons of the stuff it turns out. All right, so it is an indication of the size of its metallurgical industries. In the same way, particularly well-informed individuals—precisely those whose company tends to be avoided by anyone who is trying to enjoy himself at a party—are aware that bleaching powder was the key which unlocked the riches of India to the British Empire by making it possible for the mill owners of Liverpool to flood the Indian market with cotton textiles. But all this is very different from the benefits, fruits of science, which our modern citizen knows that he enjoys as he walks dry-shod on shoes with tough plastic soles, made of a substance so obviously the product of chemically polymerized petroleum.

And it is only with rejoicing that he sits down on the 'leatherette' seat (also an outcome of the chemical industry) of his swivelling office chair supported on legs plated with untarnishable chromium, a wonder unknown to our ancestors. Furthermore, the pleasure of the man in his office in his swivel chair is enhanced by the knowledge that no longer do workmen need to rise at five o'clock to spend long hours at low pay making the wooden office stools and roll-top desks of long ago. Today, they too enjoy motor cars, gas stoves, electric light and, if not telephones for all, at least television for all, and are able to travel and take holidays as long as their masters.

And so, after a happy day at his office or workshop, we may bring our modern scientifically blessed citizen home to his bed. Not all such citizens need to work even in the comfort of their legally protected, warm, well-lighted offices and factories. So great is the wealth that technological ingenuity produces that the community can by law decree that no young person need start life's work until he is past the age of puberty—or even later, because puberty comes early these days. Up till then the young can enjoy a life of instructional play carefully isolated from any contact with the reality from which earlier generations of children learned at an early age that what they enjoyed was only what their fathers could afford to provide, and that one day on them too would fall the duty of providing support for *their* children. Even during the middle three-fifths of their life span, the modern citizens of an up-to-date community are only expected to devote themselves to productive endeavour for 231 out of the 365 days of the year (that is approximately five-eighths). Compared with the length of time which a man would devote each day to work if he were determined to do his utmost on his own account in a hard and hostile world, the science-supported man of the present works for two-thirds or less. Truly is he fortunate in needing to devote in all barely a quarter of what, had he not been freed from slavery, would be a full working year. And before he starts he has nearly 20 years of undemanding youth while afterwards there comes a decade of senile serenity during which politicians of every colour wish him well in their every speech.

The first conversion—from a drafty, slow, unreliable and expensive horse carriage to a reliable (or, at least, comparatively reliable), swift, warm, comfortable and economical motor-car—brought with it joy and delight. And each successive advance enabling the vehicle to go further and continue going longer between punctures and, most exciting of all, the combination of technical achievements enabling it to travel faster and faster, were initially treated with the applause they deserved. Soon, however, the delight became modified. The increased capacity for speed was found not to bring unalloyed satisfaction. There is undoubtedly a relationship between an increase in the speed of travel and in the number of people killed in road accidents. The graph may not be a simple straight line in which twice the velocity is accompanied by twice the number of casualties. For example, a regulation restricting the maximum speed of heavy lorries to 20 miles an hour, instead of reducing the number of accidents on the road may actually increase them. Frustrated drivers of faster vehicles may be found to involve themselves and other people on the road in greatly increased risks in their endeavours to get past the crawling lorries. Nevertheless, the graph of death in relation to speed is a positive mathematical relationship. At one end, when the speed is reduced to zero and nobody moves at all, nobody is killed by motor-cars. At the other extreme, when the Formula 1 racing driver pushes the speed to a degree beyond which the car can stand, the machine flies to pieces and the driver is killed. Between these two lies a steady increase in risk. Consecutive advances in technology—first four-wheel brakes, then discs, improved tyres, discoveries in metallurgy leading to better springs, more reliable bearings and more controllable engines—each one of these produces a change in the detailed topography of the graph, but its general trend remains unaffected.

The existence of the curve relating speed, which is an achievement of scientific and engineering progress, and a merely human objection to being killed, which is nothing more than a statistical index of systems efficiency, leads to the intrusion of a non-scientific factor into the equation, be it the wish to stay alive or a taste for roast beef. The result of this subjective influence is to induce a change in the basically unanswerable proposition that the step-by-step application of science to public affairs makes things progressively better and better. After being accepted that to travel at 20 miles an hour in an automobile is better than to travel at 8 miles an hour on a horse, and that to travel at 60 miles an hour in a better motor-car is better than to doddle along at 20 miles an hour in an old-fashioned one, people have changed their ideas and decided that to travel at 100 miles an hour, all things considered, may not be better than to go at 70. In fact, they are opting *not* to accept the further technological possibilities which, in this field of transport, the advancement of science can offer.

The picture that I sketched a little while ago of the joy and convenience offered by the telephone is in its main essentials true. But as the possibilities of communication become more and more extensive so that each dwelling house possesses not merely a single telephone—once to be found inconveniently fixed to the wall in a draughty hall—but a telephone in every room, including the bedroom, and as 'phones extend their territory beyond the house and out into the garden, as more cars are fitted with them, as they appear with the disposable paper napkins at each table in every restaurant, and even, in more advanced cultures, as their sensors become an integral part of people's clothing, first as a 'bleeper' to call the clothing's occupant to an instrument elsewhere but, almost as we watch, the 'bleeper' becomes transformed into the miniaturized version of the sort of thing that is already a part of every policeman's uniform—as all this happens, the citizen begins to feel that he can have too much of a good thing. Then it is that the telephone becomes gradually converted from a boon into a nuisance. Instead of making life better, its very ubiquity and effectiveness make life worse. It begins to be apparent that the marvels of the telephone, advancing so swiftly from the electric current pulsing out the dots and dashes of the Morse code, to the dial telephone with the intellectual brilliance of its computerized automatic switching, supplemented by radio waves shot from the lofty convoluted minaretes which dominate each city and which call the faithful, not as they did once to prayer to think about good and evil and the purpose of life, but to business appointments by which they can acquire money or to bet on the speed and agility of a horse which they have never seen—it is becoming apparent that in this respect as well a standstill or even a retrogression might be preferable to the advancement of science.

There is another way in which too many gifts of science can fall into the lap of a modern citizen for his own good. This can come from the inexorable need for a community—any community, rich or poor, urban or rural—to pay the social cost of what they get. The capability—matchless in any other period of history—of being able to fly across the world to share the love of distant relatives, to do business, capture fleeing criminals, collect news, visit distant lands and see strange sights, must be paid for in terms of the conversion of fields of corn and meadows rich with daisies where birds sing and butterflies flutter on painted wings into ugly prison-exercise-yard stretches of infertile tarmac surrounded by the noisy uneasy restlessness of terminal buildings and hangars. The whole being the central pustule of a wider area of countryside where the noise of aircraft renders the natural exchange of human conversation impossible. In spite of all that architects can do and that money can buy, in spite of the devoted efforts of those who work there to diffuse friendship, loving-kindness and civility no one has succeeded in making an airport into a place of voluntary, far less agreeable, social resort. On the contrary, its success is measured in terms of the speed with which people can get away from it.

An airport, with all the inevitable inconveniences associated with it, is part of the price that has to be paid for the advantages of flying, one of the most brilliant technological achievements of man which has provided to this, the first period in the history of humanity, the benefits of rapid effortless and substantially safe transport. Ever since flying became publicly possible—which is little more than within the last half-century, people in every land have eagerly welcomed each successive advance in science by which it has become safer, quicker, more comfortable and more efficiently organized. To cross the Atlantic in a sailing ship was a long-drawn-out and hazardous adventure. Men and women who committed themselves to the deep knew that they were subject to shipwreck, storm and tempest. The age of steam when it came was a giant step forward. But the steamship was an evanescent step in technological progress which the aeroplane quickly brought to an end. And during the short history of flying, aeroplanes themselves have improved beyond recognition until today the great jumbo jet bears little relationship to a bird. Instead it has become a crowded hotel lobby in motion.

The question now is, whether the brains, skill and knowledge which have brought this public wonder into being are going to continue to make travel faster and more wonderful still. Or is the progress of science about to advance in a new direction? Are we perhaps at a hinge of history?

The noblest gift of science is insight. Insight into the mechanism of the living flesh allows those who possess it to control life and death, insight into the structure of matter provides mechanical power. Most important of all, an understanding of science allows a community to foresee and make provision for the future. Once the census is taken, the demographer can forecast the future. The biochemist supported by an efficient pharmaceutical industry can control the fertility of the nation's women to adjust the future members of the community to the planned provision of dwelling units. Foresight, based on scientifically adequate data, can ensure a satisfactory future for all—a future of well paved, well-lighted streets, adequate drainage, recreational facilities, teaching machines in the schools, shopping precincts and medical services. Well done, indeed. Just so was it done in the 1960s. Scholars sat down to think, computers computed, intellectual insight based on scientific scholarship—truly the fruit of the Tree of the exact Knowledge of Good and Evil. Useful thought, godlike thought, being the prelude to action, it was planned that the needs of the people who, it was confidently predicted, would inhabit the south-east corner of England fifty years ahead should be provided. To do this would require that all the area of land from the Wash to Southampton eastwards were paved and built over the houses, schools, factories, hospitals and football stadiums together with their necessary services.

But, it seemed, the price was too high. No one found fault with the plan. The data upon which the forecasts were based were impeccable, the logistics unquestionable but the original Adam, the Lumpen Proletariat—the people—moved by their feelings since their minds had been overwhelmed by the scientific plans of the planners declined to accept the rich sanitary life they were offered.

We can never have too much science. That is to say, regardless of how much is discovered about the universe and the stars in it, the stars we see with our eyes, our radio receivers or our X-ray sensors there will always be more to discover. As many Nobel prizewinners as you like can discover DNA, the so-called double helix which is the chemical molecule of heredity and, having discovered it, they can break the 'genetic code' as much as they please. Even so, they will never know enough to construct a good man out of his component parts. Come to that, psychologists of the highest and most prolonged educational status will never be able to produce an exact specification of a 'good man'. So there will always be more science to do and more things to discover. But the degree to which the ability such knowledge provides to get things done and affect practical affairs contributes to the human predicament is a different matter altogether.

How much technology is needed to provide a good life? With too little, people will feel themselves deprived of wrist watches and transistor radios. With too much, they will start talking about the evils of civilization. They will suffer so severely from what were once called smell, dirt and noise that they will give them the most evil word they know—pollution. The mass of public hardware and the weight of private possessions will drive them mad, although they will have become so frightened of the stain of madness that they will call it 'mental disturbance'. Too much technology, too automated and mechanical a life, too full of passenger transit systems geared to transport people like cans of beans on automatic conveyers to their systematized work, their mass-produced pleasures and thence to the mechanized dwelling units once called homes can, it seems, cause a relaxation in the bonds by which a corporate society is held together. Too much of the rational spread of technology undoubtedly affects the way a community views the nature of life and the quality of behaviour. Bastards, like madmen, disappear in their once-familiar (if not always popular) guise only to reappear as the children of that biological anomaly, the 'one-parent family', although it is not entirely clear whether they are much more welcome as such than they were before. In pre-scientific societies, deprived though they may have been of wrist-watches and launderettes, people nevertheless did possess some idea of good and evil, sin and virtue, to guide their behaviour. I make no judgment as to whether the sum of human happiness was greater or less for this reason when the net injection of science was low. But in the super-rational world of high technology where the amount of applied science may have become too much, there is no more sin, and the Devil, more hardly used even than poor old Father Christmas, has vanished not even to survive as a tawdry advertisement for December shopping. In place of evil there is that nebulous entity, to be changed by every whim of fashion, every speech from parliament, *anti-social behaviour,* under whose banner any unpopular action from keeping a shop (capitalism), to smoking, beating young children to death (the battered baby syndrome, not a crime, an illness like impetigo), to sodomy or robbing a bank (due to an unhappy infancy) are equal.

Inasmuch as we are now beginning not to believe all this about science, it seems to me that the hinge of history is turning.

The applicability of Editorial Processing Centres to UK publishing

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FACED WITH RAPIDLY rising production costs and slowly rising demand, publishers of scholarly journals, especially learned societies, must examine cheaper production methods and consider how to utilize advances in technology. However, most learned societies are to small too take advantage of new technologies because of the level of investment and the high volumes of throughput that are required. The concept of Editorial Processing Centres (EPCs) has been developed in the USA under the auspices of the National Science Foundation and is seen as being a means of reducing costs without eroding quality or increasing publication time. An EPC is a co-operative venture whereby a number of societies combine to provide computer support for all the functions of journal production, including editorial, printing and management functions.

An EPC could be established to perform any or all of the functions briefly outlined below.

The author submits his manuscript in OCR readable form to the EPC. The manuscript is recorded by the EPC computer and from this point there is no need to retype the original manuscript and the computer performs all routine office functions and keeps track of manuscript locations. A computer printout of the article is then mailed to the editor who telephones his decision on whether to process to the EPC. The computer can be instructed to reject or accept the manuscript, submit it to the editor of another journal or send it to referees. If the article is to be refereed, the computer selects the referees from a register in accordance with the editor's instructions. Referees record their comments in OCR form and send them to the EPC where they are accumulated by the computer. When all the referees have responded a printout of the entire file is automatically sent to the editor. If the editor then wants the author to revise his manuscript in the light of certain of the referees' remarks, he marks the relevant portions of the referees' comments and returns the printout to the EPC. A new printout containing the marked portions of the referees' comments is then sent to the author who revises the article, typing new material on special sheets in OCR form and indicating on the printout the position of deletions and additions. The EPC computer then automatically revises the original manuscript to incorporate the author's changes and sends a printout to the editor. If the editor accepts the article it is then copy edited on the EPC computer in accordance with the journal's detailed rules and standards. A printout is sent to the editor and, if approved, the article is stored with other articles until press time when it is transferred to computer tape and forwarded to the printer. Copies of the tape may also be sent to abstracting and indexing services and to

Aslib Proceedings, 28 (8), August 1976, p. 266–270. Printed in Great Britain.

information analysis centres. Further refinements include 'on-line' submission of referees' comments and the compilation of bibliographies by computer.

In 1972, the US National Science Foundation commissioned Aspen Systems Corp. and Westat Inc. to investigate the economic feasibility of applying computer technology to the publication of scientific journals. In a series of studies they developed four progressive configurations of EPCs and an economic model which showed cost savings of up to 15 per cent over conventional methods (depending on the configuration adopted and the number of journals processed). Aspen/Westat produced a seventy-page booklet summarizing the main findings of the study. *Editorial Processing Centres: feasibility and promise,* by Aspen Systems Corp., published by the National Science Foundation, Office of Science Information Services, has been produced using the technology described in it. The National Science Foundation has now allocated $1 million for developmental work on EPCs over the next 4 years. Aspen Systems Corp. has been awarded a grant to test various aspects of the EPC with different learned societies.

The British Library Research and Development Department commissioned the Aslib R & D Department to evaluate the Aspen/Westat studies and to review and evaluate the potential of EPCs in the UK[1]. Economic pressure on publishers of learned journals in the UK did not seem to be as great as the Aspen/Westat studies had indicated the case to be in the United States. Learned society publishers expressed little immediate concern about the economics of publishing. This could be due to pricing policy, income from other sources (*e.g.* membership fees), the pressure on libraries to maintain journal subscriptions even at the expense of monographs and the cushioning effect of an international market. However, the indications are that the economic pressures on learned society publishing will increase in the near future. The assumption that investment in computer-based systems can reduce costs for publishers provided that there is a sufficient volume of throughput to spread the capital and systems operating investment also needs examining in the UK context. Many of the intellectual functions involved (*e.g.* evaluation, synthesis and judgment) are closely tied in with the clerical (or potentially automated) operations and may be difficult to separate. Examples are selection of referees (which is often based on personal knowledge) and issue make-up. OCR equipment is less widely used in the UK and few authors (particularly from overseas) would be capable of producing articles in acceptable OCR format. Although it is suggested that EPCs could make great savings by using computer typesetting, the ability of present computer typesetting systems to handle large volumes of straight text interspersed with tables and graphs plus highly formatted bibliographic material needs to be closely examined. Computer operated manuscript logging and tracking systems can achieve little more than an efficient manual system and on-line text editing may raise problems by breaking down the traditional demarcation between printer and publisher.

If the concept of an EPC is a valid one it must reduce the cost of publishing scientific learned material without reducing quality or speed. Overall, the cost analyses carried out by Aspen/Westat show that the EPC does have the potential for significantly reducing journal costs. However, particular care must be taken when considering development/start-up costs, the value of donated editorial costs (*e.g.* an honorary editor's time) and donated overhead costs (*e.g.* desk space and typing facilities provided by the honorary editor's employer). The editorial costs of small societies would be significantly affected if the editorial staff were brought into the EPC, so making many hidden costs into real costs.

Aslib R & D Department evaluated the concepts of the EPC and its fundamental assumptions by discussions with a number of major learned society-type publishers and by undertaking a series of small desk studies of differences in learned publishing between the USA and the UK in the context of EPCs. In UK learned society publishing there is a marked break between the editorial and production processes. The editor can be either full-time or honorary (depending upon the size of the society); he is often assisted by an editorial board and some form of refereeing is used to assist in manuscript selection. On the production side hot metal processes are gradually being replaced by off-set litho but there is a marked reluctance to change to new methods. Many of the smaller societies seem to be restricting the length of papers they will accept. Circulations are still rising steadily and overseas sales constitute a large part of total circulation. It is difficult to obtain meaningful costs for learned society publications because editorial costs are often met out of membership subscriptions but the use of honorary editors means that much of the editor's time, secretarial help and overheads are donated by outside organizations. If an EPC were to be established some of these arrangements would have to be formalized as there would be less opportunity for the editor to work in his spare time—on the train, etc.

There are a number of differences between learned society publishing in the UK and in the USA which might necessitate some modification of the EPC concept. American societies are much larger than their British counterparts and so have a larger subscription base for their journals. The US societies employ more professional staff and there should be fewer hidden costs in US society publications. American journals have a greater number of individual subscribers who are more sensitive to price changes than the institutional subscribers. The major difference in learned society publishing practices between the two countries is the use of page charging in the USA. The payments of page charges for publication of work generated under federal research and development contracts can be offset by the conditions of grant. This means that the Federal Government is effectively subsidizing a large part of US learned society publishing and can justify a substantial investment in the development of EPC-type ventures if it can thereby save money on grant-aided payment of page charges. The page charging system also provides a direct method of influencing authors to produce good OCR-copy by offering a reduction in page charges. Many more UK than US learned societies 'contract out' the publication of their journals to commercial publishers. Theoretically, at least, this should pre-empt some of the need for EPCs, as commercial publishers are in a position to take advantage of printing innovations and to provide professional back-up services. The final difference is the greater international authorship of UK journals. This is partly due to historical links with the Commonwealth, and is probably reinforced by page charging in the USA. It would be more difficult for an

EPC to obtain OCR-copy from foreign contributors and to establish interactive communications with authors.

Many of the technologies currently available offer some advantages to the publishing industry. OCR techniques and computer photocomposition have already been implemented in printing firms. Computer-input-microfilming, a development in direct scanning of text for data-capture, is now available. Developments in word processing and minicomputer systems offer potential advantages to learned society publishers and if the rumours of a new development linking Xerographic reproduction with displays generated by computer from stored information are correct, the production of tailored one-off printing runs for individuals based on a common store of data becomes possible. The continuing development of on-line networks for the processing of scientific information will have two direct implications for EPCs. First, authors could input text directly to the EPC which might prove more acceptable to authors than producing good OCR copy, and secondly a practical interaction mechanism between voluntary subject editors and the EPC can be provided. These developments also influence other publishing methods and may effect the overall viability of EPCs.

Aslib R & D Department produced an outline EPC specifically tailored for UK learned society publishing. This design (called a Co-operative Publishing Office and described in Appendix C, *British Library* R *&* D *Report* 5270) eliminates the requirement for author generated OCR copy and provides edited, formatted text on magnetic tape for delivery to a printer for justification, pagination, photocomposing and printing. On the basis of this design, development costs, fixed operating costs and variable operating costs were estimated. It was difficult to provide a good basis for comparison, but the projected CPO costs were compared with the costings of a hypothetical journal published by a large UK learned society. This rough comparison showed that when all editorial and associated overheads are included, the CPO becomes economically feasible above a level of 11,000 pages per year. Once a stable base of operations has been achieved it is possible that services (e.g. editorial management services, text editing facilities and typesetting facilities) could be offered to smaller publishers on the basis of recouping additional marginal costs and these would compare favourably with existing costs. However, a CPO would probably encounter problems at the technical, union, organizational and personal levels in obtaining co-operation from the printers. Many learned journals may be too small to take advantage of advances in technology even through the use of co-operative ventures.

Due to the difference in publishing practices between the UK and the USA it is difficult to show whether or not definite advantages would accrue from the adoption of EPC-type operations in the UK. Nevertheless it does appear that under certain conditions the introduction of computerized processing would offer significant saving in costs and additional benefits would accrue in the long term by increasing the speed of publication by making available data-processing technology, which may be required for future developments, directly to publishers. Furthermore, EPCs and other technical innovations cannot be viewed in isolation from developments in alternative publishing formats, the financial problems of libraries and learned societies, changes in mechanized handling of scientific information and fundamental reappraisals of the role and provision of information. The formation of an EPC by societies would involve considerable financial and operational risks. As the larger UK societies stand to gain most from an EPC it seems sensible that the initial development of EPCs should be undertaken by one of the larger societies. Alternatively, printers could be encouraged to develop their computer processing capacity to provide on-line editorial services, data base management services and management information services.

REFERENCE

1. WOODWARD, A. M. Editorial Processing Centres: scope in the United Kingdom. *British Library R & D Report* 5271 HC (1976). £2.00. ISBN 0 85350 139 4.

Interlibrary loan usage within Durham University Library, science section 1973/74

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THE INTERLIBRARY LOAN service was and is an 'open ended' service. The gross characteristics were known and details of each transaction were on record. What was not known was the pattern of interaction between readers, the science section and the co-operating libraries. This analysis is restricted to indicating this aspect. An alternative approach outlining the use to which information on the publications borrowed is put has been published earlier (WOODWARD, W. B., The management of periodical subscriptions in the science section of the University Library, Durham, *Aslib Proceedings,* 27 (9), September 1975, p. 385–8).

The population of possible users included 1,850 undergraduates, 260 research students and 170 staff of the twelve departments on the science site together with 'others' a category that includes other members of the university and 'external' users of the library. Table 1 shows the total number of interlibrary loans for the period 1973/74.

	Returnable loans	*Non-returnable photocopies*	*Total*
Books	1,780	102	1,882
Serials	2,319	5,558	7,877
TOTAL	4,099	5,660	9,759

TABLE 1: *Total interlibrary loans obtained 1973/74*

The analysis included 9,140 loans to 904 users. In preparing the working records (which were those created by the reader) for analysis it became apparent that library staff have to do a great deal of editing and interpretation. As a result we now have only one place in the library for ILL forms and this is designed to improve user performance through education by adjacent library staff, by charts indicating desiderata and by the proximity of working tools such as the *World List of Scientific Periodicals.*

It is of interest to note that 26 per cent of our users asked us for only one item in the year and only one reader asked for more than 150 items (Table 2). It is not possible to discover without a lot of work what proportion of our library readers did *not* use the loan service either in 1973/74 or as a general rule. It is policy that control on excessive demand should be through the daily check on requests by library staff. This examination reveals the items that we are

Aslib Proceedings, 28 (8), August 1976, p. 271–278. Printed in Great Britain.

Number of items borrowed	*Readers (%)*
1–10	73
11–20	11
21–30	6
31–40	4
41–50	2
51–100	3
101–150	1

TABLE 2: *Pattern of demand in terms of number of loans per reader*

being asked to borrow that are already in stock, when a reader should take himself to the literature and when he should modify his demands to fit his own limitations with regard to assimilation and time. It is difficult to decide if any user is abusing the service through excessive demand though an *ad hoc* inspection of completed technical papers indicated very strongly that, taking average figures, a very high level of demand on the loan service was followed by only a marginal increase in the numbers of papers cited.

Tables 3, 4 and 5 show the pattern of borrowing by department/status/type of material (the key to the department code is given in the Appendix).

The discrepancies between the figures supplied by the Registrar's Office and the user figure are striking. In the case of staff there are more people who are members of staff of the university departments than are included in the figures for academic staff. Many of the discrepancies between 'research' user figures and the registrar's figures can be accounted for by the presence in the user population of people who are writing up theses beyond the tenure of their grant, and the people who may be staff or undergraduate but who say they are 'research'

Department	*Number of staff (registrar)*	*Number of users*	*Average loans/user*	*Range*	*Periodicals (%)*	*Books (%)*
AN	9	4	9	1–27	80	20
AP	10	14	8	1–40	79	21
BO	11	28	20	1–124	83	17
CH	22	30	17	1–101	86	14
CO	—	6	22	4–80	74	26
ES	12	7	6	2–24	93	7
GG	22	35	9	1–65	68	32
GL	15	15	7	1–22	78	22
MA	20	7	10	2–32	64	36
PH	20	20	7	2–33	86	14
PS	12	15	17	1–73	62	38
ZO	10	13	20	1–119	80	20
AL		194	13	1–124	78	22

TABLE 3: *Staff borrowing*

because they consider that they are doing research. We have to make it clear that these categories (which are useful to the library in locating readers) are related to status and not to activity.

With regard to Tables 3 and 4 it is probably not surprising that where the average number of loans is low the range is also narrower but that the range for each department is usually from one to some tens to one hundred or more is worthy of comment. Where do users at the low end of the range get their information—do they share any other characteristics, is this position constant for individuals from year to year? The overall distribution of 78 per cent periodicals to 22 per cent books is much as would be expected for science based subjects (money spent on stock in 1973/74 was in the ratio 3:1 periodicals: books). The variations between departments are interesting and possibly indicate that there are some subject areas where the selection of stock needs to be improved. On the other hand it is known that in some areas research is begun, particularly by research students, in areas where it has not been and will not be policy to place periodical subscriptions. There are other questions to be put: for example, are chemistry research students 'fed' information through the research team structure? Do we detect a real difference of level of demand as between the social sciences, the life sciences, the physical sciences and the mathematicians, or are the differences due to local geography or social habit?

Department	*Number of research students (registrar)*	*Number of users*	*Average loans/user*	*Range*	*Periodicals (%)*	*Books (%)*
AN	23	24	26	2–155	80	20
AP	20	33	9	1–48	72	28
BO	32	53*	18	1–123	89	11
CH	21	36	8	1–44	81	19
CO	—	3	20	2–55	84	16
ES	9	18	8	1–25	83	17
GG	39	58	22	1–120	62	38
GL	46	57*	9	1–89	85	15
MA	16	13	2	1–12	55	45
PH	42	38	5	1–27	59	41
PS	11	28	14	1–136	62	38
ZO	26	42*	20	1–128	94	6
AL		403	14	1–55	78	22

* Includes 1 year M.Sc. taught course.

TABLE 4: *Research borrowing*

Table 5 shows what a small proportion of undergraduates use the service in any one year; one hopes that they realize that they can use this type of resource when they have left university. While it can be flatteringly argued that the stock of the library has been so closely matched to their needs by management practices that they do not need an interlibrary loan, a more realistic view says

Department	*Number of undergraduates (registrar)*	*Number of users*	*Average loans/user*	*Range*	*Periodicals (%)*	*Books (%)*
AN	155	18	2	1–11	60	40
AP	85	11	2	1–5	67	33
BO	128	40	4	1–32	79	21
CH	159	19	3	1–25	69	31
CO	—	1	1	1–1	—	100
ES	120	24	3	1–24	60	40
GG	301	72	2	1–35	69	31
GL	157	21	2	1–6	60	40
MA	265	9	2	1–4	—	100
PH	170	16	2	1–3	73	27
PS	170	48	3	1–29	66	34
ZO	114	28	4	1–29	73	27
AL		307	3	1–35	72	28

TABLE 5: *Undergraduate borrowing*

that if they use abstracting services as perhaps they should, then inevitably there must be a demand on external resources.

There is little formal instruction given by library staff to research students in either the use of libraries or of published information sources. (Table 6). There are subject areas where students apparently start with a great library effort (CO & PS) but this may for CO users be biased through the effect of a few heavy users. It would appear that skills in library use are needed in year one, and that there is little real point in allowing postgraduates to learn casually and in such a way that the time of library staff is not used optimally.

Department	*1st year*	*2nd year*	*3rd year*
AN	14	33	31
AP	20	6	2
BO	12*	15	30
CH	19	8	8
CO	47	—	—
ES	13	3	10
GG	23	27	15
GL	8*	6	4
MA	1	7	1
PH	3	7	4
PS	39	—	2
ZO	10*	10	35
AL	14	16	15

* Includes one year M.Sc.

TABLE 6: *Average number of loans to research students by 'age'*

The analysis includes a number of facets which indicate how users do obtain and use publications and the responses of co-operating libraries. The 'source of reference' slot on the initial application form is intended to help library staff to solve problems without, if at all possible, invoking the user. Table 7 gives the user response.

Department	%	*Department*	%	*Department*	%	*Department*	%
AN	48	CO	18	MA	34	AL	48
AP	40	ES	51	PH	45		
BO	46	GG	53	PS	45		
CH	78	GL	43	ZO	47		

TABLE 7: *Number of times 'source of reference' completed as percentage of all loans*

It is surprising that one-fifth of all requests for periodicals (Table 8) should originate from a reference in a book. What price publication delays, or are references in books to 'classics'?

Regarding Table 9, there is not a great deal of surprise here. One may assume the excellence of *Chemical Abstracts* for chemistry and indeed one may assume a relationship between dependence on and currency of and completeness of the appropriate abstracting service rather than just the information need of the user.

	Abs./Ind./Bib.	*Journal*	*Book*	*Pers. Comm.*	*Comp. Inf. Ser.*	*Thesis*	*Conf.*	*Lib.*
For periodical loans	38	31	22	4	2	1	1	1
For book loans	16	25	30	9	0	3	1	16

TABLE 8: *Source of reference as percentage of sources given (see Appendix)*

'Books' are less easily managed in relation to demand than are periodicals (Table 10). How difficult are the various sub-sets of 'books' to get? As expected foreign language titles form the most difficult category. Review publications appear to be the easiest of all and conference proceedings are not now the problem that they once were. We should note that Geological Surveys (which we include in with Reports) have a low initial success rate of only 57 per cent. Our experience is that readers need this material for a 'long' time relative to other forms of publication; as a direct result of this survey the library has reinforced its policy of buying Geological Survey material as comprehensively as possible and of buying duplicates to cover undergraduate project work.

According to Table 11, it would appear that the loan period of 3 weeks is adequate except for 15 per cent of theses and items in this class are easily dealt with as special cases.

Dept.	*Abs./Ind./Bib.*	*Journal*	*Book*	*Pers. comm.*	*Comp. Inf. Ser.*	*Thesis*	*Conf.*	*Lib.*
AN	13	22	51	9	—	5	—	—
AP	47	29	21	1	—	3	—	—
BO	30	47	16	2	3	1	1	—
CH	73	13	7	2	5	1	—	—
CO	30	22	39	—	9	—	—	—
ES	25	33	13	—	1	10	18	—
GG	32	29	33	3	—	1	—	2
GL	18	56	18	5	—	1	2	—
MA	44	31	25	—	—	—	—	—
PH	54	17	21	4	—	1	1	2
PS	47	22	24	3	1	—	2	—
ZO	30	40	20	8	—	1	1	—
AL	38	31	22	4	2	1	1	1

TABLE 9: *Source of reference as percentage of sources given—periodical loans (see Appendix)*

Percentage of total		*Percentage of success on application*			
		1st	*2nd*	*3rd*	*4th*
5	Conference proceedings	81	16	2	—
75	Monographs	79	17	4	< 1
3	Monographs—foreign titles	41	53	4	1
6	Reports	75	21	1	2
7	Theses	71	27	2	—
4	Reviews	89	11	—	—
100	All	75	22	3	1

TABLE 10: *Book loans—type of item supplied and relative ease of locating loan copy*

	Number renewal requested (%)	*One renewal requested* (%)	*Two renewals requested* (%)
Theses	85	12	3
Conference proceedings	98	2	—
Foreign language books	93	6	1
Reviews	98	2	—
Reports	98	1	> 1

TABLE 11: *Loan period for books*

AN	9	CO	4	MA	2	AL	4
AP	10	ES	6	PH	5		
BO	6	GG	2	PS	2		
CH	1	GL	12	ZO	0		

TABLE 12: *Total renewal requests by borrowers as percentage of all 'book' loans to each department*

Of the renewal requests made (Table 12) 11 per cent were from staff, 70 per cent from research students and 18 per cent from undergraduates. The relatively high proportion of renewal requests by geologists is probably keyed to use of Geological Survey material.

With regard to recall of theses, in the strict sense these are not recalls since theses are held in the library. The figure refers to a note which says: 'The thesis is due for return, have you any further need of it?'

	No recall	*1 recall*	*2 recalls*	*3 recalls*
All books	72	25	3	< 1
Theses	91	9	—	—
Conference proceedings	68	29	3	—
Foreign language books	71	24	6	—
Reviews	70	25	5	—
Reports	84	13	2	—

Note. Recalls were sent in 22 per cent of periodical loans, and 2 per cent of loans needed a second-recall, less than 1 per cent a third recall.

TABLE 13: *Recalls sent to borrowers by type of material (as a percentage)*

If a comparison is made between Tables 12 and 13 it is apparent that there is an overall discrepancy. This may be explained by the inertia of users in failing to complete transactions once the object of the transaction has satisfied their information need. It is apparent from both Tables 13 and 14 that economies of library staff time can be achieved through improved user performance.

The conclusions that have been made from these analyses include the following. User education must be a continuing activity aimed at both departmental group and individual users and this must be done by direct person to person

AN	35	CO	72	MA	31	AL	32
AP	39	ES	26	PH	37		
BO	40	GG	22	PS	40		
CH	46	GL	27	ZO	20		

TABLE 14: *Total recall notices by department as percentage of loans to department*

methods as well as by so organizing services that users acquire desirable characteristics as they use the service. Monitoring the level of use of the service, of assessing current effectiveness of routine and of alternative sources of publications is best done on a daily basis by having experienced library staff scan current transactions in order that they may identify any need for other than routine action and see that that action is taken.

Acknowledgement

The author is grateful to his colleagues in the Computer Unit and in particular to Mr J. Steele for their very practical help in processing data.

APPENDIX

Key to departments

AN = Anthropology
AP = Applied Physics and Electronics
BO = Botany
CH = Chemistry
CO = Computing
ES = Engineering Science
GG = Geography
GL = Geological Sciences
MA = Mathematics
PH = Physics
PS = Psychology
ZO = Zoology

Key to Tables 8 and 9

Abs. = Abstracts
Ind. = Indexes
Bib. = Bibliographies
Journal = Journals
Book = Books
Pers. Comm. = Personal communications
Comp. Inf. Ser. = Computer Information Services
Thesis = Theses
Conf. = Conference Proceedings
Lib. = Libraries

Technical Note

The INSPEC scheme as a library classification

Ian Malley

Maria Mercer Physics Library, University of Bristol

FOR SOME YEARS there has been disenchantment with the traditional, general classification schemes, and many special schemes covering single disciplines have appeared. Not all of these have been developed with library classification in mind.

In January 1973 INSPEC produced a unified classification scheme for the INSPEC data base, covering the subject areas of physics, electrotechnology, computers and control, in one integrated structure.[1] From this unified scheme three sectional classifications were generated for displaying the entries in the INSPEC abstracts journals.[2]

The scheme was thus primarily concerned to classify scientific research papers. We believed that it could be successfully applied to the classification of books and for this purpose we adopted the physics sectional classification in the Maria Mercer Physics Library which serves the needs of members of the physics department of the University of Bristol. Our experience in applying the scheme is summed up in the following notes. They may be useful to other libraries contemplating using this classification or indeed any other abstracts journal scheme to classify its stock.

Why choose the scheme

Physics is a discipline which is continually undergoing change and increasing specialization. This is reflected in the appearance of books on narrower, more specialized topics. Large, general classification schemes lag behind, and it has proved difficult to classify many new books satisfactorily. The INSPEC scheme on the other hand looked ideal. It was up to date. It was backed by a large organization which, because of the function of the scheme, just had to update regularly. It was prepared by physicists for physicists.

There was another important advantage: *Physics Abstracts* (one of the INSPEC abstracts journals) is the major abstracts journal in physics. It is well known and used by physicists everywhere. Our department would therefore be familiar with the structure and notation of the scheme.

Lastly, the subject range of the scheme—a core of physics plus several fringe subjects including materials science, geophysics and astronomy—seemed to fit our stock neatly.

Close classification

The scheme has four levels of hierarchy and many of the sub-sections are very

Aslib Proceedings, 28 (8), August 1976, p. 279–282. Printed in Great Britain.

detailed—as befits research papers. Close classification for our purpose might have seemed indulgent and unnecessary; nevertheless we decided not to abridge the scheme.

We had some confidence in the dictum about the papers of today being the books of tomorrow, and this is on the way to being justified. Admittedly only about 50 per cent of the fourth level classification numbers have been used so far. But while the numbers of books in this category is now 12 per cent of the library's bookstock of just over 10,000, in the last 6 months almost 25 per cent of our accessions have required a fourth level number.

There was one other reason, and this was that we wanted to use the subject index provided. Many subject headings refer to fourth level numbers, and if we used a shortened version of the scheme, the reader would often be directed to non-existent sub-sections.

Subject index

The availability of a ready-made index was one of the attractions of the scheme and we have tried to keep it intact. Yet it has not been entirely satisfactory. The index has in fact produced some false trails, because we do not have books at every number. But as the sections are gradually filled this proves to be less of an annoyance to the reader.

The combination of the lack of some broad subject headings and the large number of very specialized headings has occasionally been a headache for the undergraduate who could not cope with, say, two dozen headings prefixed by 'nuclear', when he or she simply wanted a general textbook on nuclear physics. One way of alleviating this has been to display the subject classification schedules alongside the index. The same solution has helped in a related problem—the absence of verbal extensions. Some headings direct the reader to as many as seven different locations and this is time-consuming.

One last disadvantage has been that not all of the sub-sections have entries in the index, *e.g.* the sub-sections of 5.600—Macromolecules and polymers. Consequently we have been disinclined to use these sub-sections.

Old books

A scheme for classifying research papers of the 1970s is unlikely to make much provision for textbooks published in the 1870s. Since ours is a university library, we expected this to be a difficult area. The problem is not quite so much that these older books are very broad in scope but that their contents reflect a rather different approach to physics than is now current. Thus many cut across several broad areas of the scheme.

The solution has varied. Some items could be regarded as the early, seminal texts in later, easily recognizable classes and accordingly they have been placed at the most general number in that class. For others, and this has been a very small number, there has been no alternative but to put them at the General Physics at 0.200. The problem has not been as great as had been anticipated, however, and indeed a surprising proportion of old books has justified third and even fourth level numbers.

Notation

The INSPEC unified classification scheme has a six-letter hierarchical notation. Each of the three sectional classifications has a four-digit hierarchical notation. It would have been possible, and in some ways convenient, to use the six-letter notation but we decided against it for several reasons.

As far as its qualities as a notation are concerned, the digit notation is a clear choice. It is brief, simple, easy to remember, and infinitely hospitable to new numbers. The letter notation is also infinitely hospitable, but it is not quite so brief, nor so simple, and it has very poor mnemonic value.

There were two other reasons. First, the unified scheme has no subject index. Secondly, members of our department were familiar with the digit notation but not with the letter notation.

It is unfortunate that INSPEC did not allocate a mutually exclusive set of numbers to each of the sectional schemes. The Electrical and Electronics section covers the numbers from 1.000 to 5.890, while the Computers and Control section ranges from 6.000 to 9.980. But the Physics section overlaps both sets, using 0.000 to 9.890.

Some topics, *e.g.* electronic circuits, telecommunications, etc., are not accommodated in the Physics scheme. We could have classified books on such subjects simply by using the appropriate classification numbers from the Electrical and Electronics scheme, if the numbers had been non-overlapping. We have in fact managed to do this, by placing the digit '1' before each of the Electrical and Electronics numbers, so that books on electronics are classified from 11.000 to 15.890. This has meant that we could use the subject index belonging to this scheme. The solution is not ideal, but it will probably be a temporary one, if we judge present developments correctly.

Future developments

For the past few years the establishment of a World Classification in Physics has been discussed by INSPEC, AIP (American Institute of Physics), *Bulletin Signalètique* and *Physikalische Berichte,* all operating under the auspices of ICSU-AB (International Council of Scientific Unions Abstracting Board), whose Working Group in Physics is coordinating the whole effort. Initially the INSPEC scheme was suggested as a basis for this World Classification.[3]

In 1975, AIP published PACS' 75 (*Physics and Astronomy Classification Scheme,* 1975 version).[4] It is based on the INSPEC scheme and very similar to it, though with many additional sections. Except for certain peripheral area subjects this has been accepted by the member services of ICSU-AB. PACS '75 thus has claims to being a world scheme, although further alterations are expected before it is widely used in secondary (and primary) physics journals, and in particular in the INSPEC abstracts journals.

As soon as INSPEC makes the changes we will follow suit. When we chose the INSPEC scheme we recognized that it was only one step towards a universal physics classification (indeed this was another of the attractions) and changes would have to be made as it evolved. It now seems that only minor modifications to the structure plus a simple reallocation of classification numbers will be necessary in the foreseeable future.

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2 Subject classification schedules and subject indexes for each sectional classification appear in every issue of the corresponding INSPEC abstracts journal.
3 *INSPEC Matters,* No. 8, 1974.
4 *Physics and Astronomy Classification Scheme* (AIP Pub R-261.1). American Institute of Physics, 1975.

EUROPEAN USER SERIES 3

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BRIEF REVIEWS

BRITTAIN, J. M. *and* ROBERTS, S. A. *eds*, Inventory of information resources in the social sciences. Farnborough, Hants, Saxon House, 1975. £6.50. (ISBN 0 347 01092 X.)

This is a list of about 450 information services and sources, most of which are in Western Europe. The book, which was produced for OECD by the University of Bath, is directed at a number of potential user groups: social scientists, those who supply them with information services and policy makers who are concerned with the social sciences and with the results of social science research. It is also aimed at information system designers and planners and it is not easy to see how such a varied audience can be catered for by a volume of this nature. Little information about the selection criteria is given. However, libraries are only included if they provide services which are not available anywhere else. A number of research projects dealing with information in the social sciences or which are concerned with social scientists as information users are also included.

MORRIS, CLARE *ed.*, Literature and the social worker: a reading list for practitioners, teachers, students and voluntary workers. London, Library Association, 1975. 22 pp. £0.80 (£0.64 to members). (ISBN 0 85365 078 0.)

This booklet must be one of the most interesting ideas ever to be produced by the Library Association. Basically, it is an annotated, classified list of novels (although one or two non-fiction works are also included) which deal with human relationships and problems. The various sections of the booklet cover the stages of life, family relationships, social deviancy and a variety of other topics such as communication difficulties. The aim is to emphasize to those who are studying to be social workers that their academic studies and future work are really concerned with people. This is something which is frequently forgotten by both students and teachers, yet is of prime importance. The items on the list are also valuable for another reason. The more complicated ideas relating to human relationships, in such subjects as sociology and psychology, can often be more meaningfully explained, and with greater effect, by an empathetic novelist than by a bland text-book writer. A good novel also has the advantage that it is enjoyable to read. It will be a pity if the title of this publication restricts its readership to one group of practitioners; there are members of other groups, such as doctors and teachers, who would benefit from a guide of this sort. Indeed, many of the titles suggested by Clare Morris would be appropriate on the 'highly recommended' sections of the reading lists of social science students.

WALFORD, A. J. *ed.*, Guide to reference material; vol. 2, social and historical sciences, philosophy and religion. 3rd ed. London, Library Association, 1975. 647 pp. £11 (£8.80 to members). (ISBN 0 85365 088 8.)

The latest edition of Walford's *Guide to reference material* follows the same pattern as did the earlier ones. It is arranged by UDC and, for each subject, lists the more important reference books, bibliographies and other secondary tools. All the entries contain full bibliographical details of the items concerned as well as short descriptions of their contents and, in many cases, details of where critical reviews can be found. This volume covers UDC classes 1 (philosophy and psychology), 2 (religion), 3 (social sciences and education) and 9 (geography, biography and history). Because of this arrangement, related topics are not always together (for example, economics is in this volume, while management is in volume 1). To some extent, this problem should be eased when the third edition is completed, as a cumulative index is to be included in the final volume. This is due to appear in late 1976 or early 1977. There are two groups of users for whom this work will always be of particular value: librarians who are building up or revising their reference collections, and library school students who need to discover the bibliographical structure of a subject or who are given the task of setting up model specialist collections.

BURRINGTON, G., How to find out about the social sciences. Oxford, Pergamon, 1975. 144 pp. £3.30 (ISBN 0 08 018289 5.)

The aim of this book is to indicate the sources of information in the social sciences. The emphasis is on showing the value of the different types of material which are available, to describe the scope and use of the more significant bibliographical tools and to indicate where detailed information on particular subjects can be found. Unfortunately, the book does not live up to these claims. There is little attempt at providing critical assessments of the sources which are mentioned and several chapters contain fairly long and undifferentiated lists of sources which are likely to be confusing to many readers. The book does, however, contain a useful chapter on how libraries are organized and the services they provide.

RALPH ADAM
The City University

CROWLEY, ELLEN T. *ed.,* Trade names dictionary. Detroit, Mich., Gale, 1976. 666 pp. (2 vols). $65.00. (ISBN 0 8103 0692 1.)

The identification of trade names is an area which is inadequately covered in the published sources and any reference work in this field must be a welcome addition. The value of any particular index will only become evident after it has succeeded or failed to answer actual enquiries. The Gale Research Company's *Trade Names Dictionary* must be evaluated within the limits of the areas it claims to cover. The sources used in compiling the dictionary are specialized guides, all published in the United States, and it places an emphasis on merchandise sold for personal use and consumer items. As such it should not be judged for its ability to provide information about products of a highly technical nature but within its field, its sheer size of over 106,000 entries in a single alphabetical sequence make it an invaluable tool. It is well cross-referenced with entries appearing under trade names and company names. Brief descriptions of the product are provided, along with the address of the manufacturer or distributor.

The intention to publish supplements entitled *New Trade Names* must also be welcomed in a field which almost immediately requires updating.

USA NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, NASA Thesaurus, 1976 edition; vols 1 and 2. Washington D.C., NASA, 1976. 809+432 pp., $15.00 (vol. 1); $8.50 (vol. 2). NASA SP-7050. Available from: National Technical Information Service (NTIS), Springfield, Virginia 22161.

The 1976 edition of the *NASA Thesaurus* comprises two volumes: Volume 1: Alphabetical Listing and Volume 2: Access Vocabulary. The 'Alphabetical Listing' contains all the subject terms (postable and non-postable) approved for use in the NASA scientific and technical information system. Included are the subject terms of the 1967 Preliminary Edition, of the 1971 Alphabetical Update, and terms approved, through 1975. Thesaurus structuring, including scope notes, a generic structure with broader term/narrower term relationships displayed in embedded hierarchies, and other cross references, is provided for each term as appropriate. The second volume, 'Access Vocabulary' provides access to the postable terms of volume 1. It contains an alphabetical listing of all Thesaurus terms, postable and non-postable, and permutations of all multi-word and pseudo-multi-word terms. Also included are Other Words (non-Thesaurus terms) consisting of abbreviations, chemical symbols, etc.

GRANT, M. M. *and* COTE, N., Directory of business and financial services. 7th ed. New York, SLA, 1976. 232 pp. $18.80. (ISBN 0 87111 212 4.)

This is the first revision since 1963 of a publication which is a necessary if not vital annotated reference source for all those who wish to trace services offering 'information distributed by individuals or companies which make a business of compiling and publishing for general distribution, data and statistics on given subjects, kept up to date by revised and supplemental data issued either regularly or irregularly.' Certain criteria have been applied in selection: English language services only; no government publications, directories, newspapers or periodicals; only services available to the general public.

The publications listed are predominantly American in origin; of the total of 1,051, 81 are Canadian, 63 English and 39 from a total of eleven other countries. Numbered entries are listed alphabetically by title and include the full address of the publisher. The annotation includes scope, form, frequency and subscription rate. The necessary subject approach to the wide variety of services covered is provided by a commendably detailed subject index. Users will also find useful the list of stock and commodity exchanges with addresses and titles of publications where relevant. There is a further index to the 420 or so publishers. This publication should find a ready market.

DEVERS, C., KATZ, D. B. *and* REGAN, M. *eds,* Guide to special issues and indexes of periodicals. 2nd ed. New York, SLA, 1976. 312 pp. $14. 50. (ISBN 0 87111 224 3.)

Information on special issues and indexes of periodicals can be difficult to obtain through normal sources and so the second edition of this guide is most welcome. It includes details of special features appearing on a regular basis in North American periodicals and indicates whether there are separate supplements or not. Details of editorial indexes are given as well as advertiser indexes whose frequencies are given when these do not occur in every issue. The periodicals are arranged in alphabetical order and the address, frequency and subscription prices (when available) are given, as well as the price of special issues or indexes mentioned. The coverage is wide, including industry, business and leisure with a subject index which is concerned with the subject emphasis contained in the special issues only. Its purpose is to define as finely as possible the contents of such special issues. It does not include periodicals containing editorial and/or advertiser indexes only. Associations are listed in the subject index when there is a special issue devoted to a report of a conference and/or an exhibition of that association. In addition there is a classified list of periodicals (new to this edition) which for some reason is at the front of the guide and not more logically next to the subject index at the back. Also new in the second edition are more periodicals (1,256 against 799 in the first edition) including a number of Canadian periodicals whose subscription prices are given when possible in both Canadian and US dollars.

As issues of North American periodicals are probably easier to obtain than directories and buyers' guides listing much the same information as special issues, this guide serves a useful function. An equivalent publication for United Kingdom periodicals would be most welcome.

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School of Librarianship, Polytechnic of North London

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1976 *152 pages* *0 408 70777 1* *£5.50*

Butterworth & Co. (Publishers) Ltd.,
Borough Green, Sevenoaks, Kent TN15 8PH
Telephone Borough Green (0732) 884567

Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed at the Alden Press, Oxford

ISSN 0001 253X

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Aslib Proceedings

VOLUME 28 SEPTEMBER 1976 NUMBER 9

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Contributions, which should be typewritten, double spaced, single-sided on A4 paper, and not more than 3,000 words in length, should be addressed to the Editor, *Aslib Proceedings*, 3 Belgrave Square, London SW1X 8PL. If possible, authors should include a summary of up to 200 words with the typescript. Authors will receive twenty-five offprints of their article free of charge.

Work study in a polytechnic library

W. A. J. Masterson

Newcastle upon Tyne Polytechnic Library

A study of the work of 47 polytechnic library staff was made during summer 1975. Data were collected on self-administered diary forms and analysed to show the proportion of time spent on specific activities by staff at different grades, and to show the unit times required for certain operations. Results for individual departments are also given. The data are put to use to show how staffing levels may be set both in the long term, to process a given volume of business, and in the short term, to allow for varying staff availability. Comparisons are made with previous work elsewhere.

Background

NEWCASTLE UPON TYNE Polytechnic Library has for some years based its staffing on the results of work studies. A major study in January 1972 provided data for a long-term development plan, and for the staffing of a proposed extension. By mid-1975 this needed revision due to changed circumstances. The library was now operating in three separate buildings, and the volume of books and users had greatly increased. There was also an impression that staff had 'tried hard' during the 1972 study. The present study therefore was undertaken:

(i) to provide data for long-term manpower planning, by indicating the number of man-hours required to process a given volume of work;
(ii) to provide data for short-term planning, by indicating how staff are employed at present.

It would have been possible to repeat the previous study exactly. However, examination of similar studies elsewhere indicated some refinements in survey procedure which would help eliminate the bias suspected in the 1972 study, and which would give a more detailed breakdown of tasks into their constituent units. In particular, we considered the City of London Polytechnic's 1973 Diary Survey,[1] which itself owed part of its design to the costing studies of the Birmingham Libraries Cooperative Mechanisation Project[2] and of Southampton University,[3] and to the report by Ford on costing.[4] Further notice was taken of the Cambridge Library Management Research Unit's approach to work study in libraries,[5] and to the work of Aslib on timing and analysis of library operations.[6, 7]

Survey design

The first stage involved interviewing staff to obtain a detailed description of the various sub-systems of the library, and to identify tasks and task elements. The level of detail in task description in the surveys referred to above was felt to be too great for practical survey purposes. Perusal of the Work Codes

Aslib Proceedings, 28 (9), September 1976, p. 288–304. Printed in Great Britain

(Appendix 1) shows that some sub-systems of the library were given greater attention than others. While a fully detailed description is useful for understanding the work of a library, the problems of data collection suggest a more simple approach. Two methods of data collection were considered, self-administered diary and independent observation. The latter, however, required extra staff which were not available to us, although trained observers could probably have coped with the extra detail.[8] We decided to use the diary method developed by Woods[3] and Pritchard,[1] in which the day is divided into quarter-hour periods, and activities occurring during each period are noted against that period in the diary. Activities lasting more than a quarter of an hour are re-entered in the next period. The method requires little interruption to normal routines if codes are used to describe tasks quickly. Time is divided evenly among tasks occurring in the same quarter-hour period. This introduces a distortion, but if the survey is conducted over a period of more than two weeks, the distortion is probably insignificant.

In addition to recording time on particular tasks, it was necessary to obtain counts of items processed wherever possible. Woods and Pritchard used the staff concerned to count items as they were processed, and this required two sorts of code ('count' and 'non-count'). To save time spent on completing survey records, and to impose a degree of control over data collection we decided to have counts made or supervised by section heads, and carried out once daily rather than at the actual time of processing. Wherever possible we used counts already made by staff as part of their duties. This meant that we were unable to relate units of work produced to the actual member of staff concerned, and can therefore give no unit-time for particular grades of staff. As this was not primarily a costing exercise, this was felt to be an acceptable loss; also the previous study had not provided this data.

In addition staff were asked to note actual journeys made between parts of the library. At present staff are spread among three main and two subsidiary service points, yet the system is designed for a single-site library. As the library will operate from one site only when an extension is completed we decided to see to what extent journeys between sites were detracting from productive working time.

The resulting times for jobs and unit times were analysed by grade of staff and by site library. The results reported below show a figure for 'Time off'. This included both paid and unpaid time when no library work could be expected (e.g. annual leave, visits, lunch hours etc). This has been deducted from the diary time to give a figure of available working time (AWT in Pritchard's survey). Another sort of non-productive working time has been termed Balance, and includes tea breaks, travelling between libraries, personal current awareness (as opposed to providing a current awareness service for users) and so on. This sort of activity is included in 'available working time', constituting a sort of necessary interruption.

As Thomas's survey of library managers[7] showed, a considerable portion of library time is spent in meetings and communication, and so several sorts of communication were identified. One of these we termed 'consultation' with other members of staff. This is defined as consultation outside one's own department: cataloguers discussing cataloguing are cataloguing, while a cataloguer 'consults' with a readers' services librarian. This is essentially another necessary interruption.

AWT is a useful concept for staff planning, particularly when refined by calculation of interruptions and Balance time. Another concept employed below is Primary Task Time (PTT). This is simply that portion of AWT spent on the special duties of staff as opposed to the common or shared duties (e.g. issuing books, shelving, etc.). Smith and Schofield[5] employed this concept in devising a diary which recorded only exceptional tasks: PTT was calculated by subtracting time on exceptions from AWT.

All staff except the Librarian, the Teaching Co-ordinator and the Graphic Designer participated in the survey, but as the major interest was on the day-to-day work of the library, and particularly the operation of the main sub-systems, the results presented exclude data from the Deputy Librarian, Planning and Research Librarian and Librarian's secretary, all of whom are mainly concerned with library administration.

The timing of the survey affects the results obtained. The survey covered three weeks at the end of the summer term and one week of vacation (except for the education site library, where full term continued). Therefore library issues were light, although returns were heavy. Registration scarcely occurred, and enquiry work was considerably reduced. Consequently the time available for processing books and periodicals increased. Further surveys were carried out in February and March 1976, this time using an observer, of work on the issue desks to complement the picture.

Results

Proportion of time spent

Table 1 shows the proportion of available working time spent on major task areas by grades for all parts of the library. We note that Balance time is fairly constant, around 7 per cent of AWT for all grades. Consultation accounts for another 6 per cent of AWT, and together these 'interruptions' add up to 13 per cent of AWT; however, senior staff consult more than junior staff, that is, their work suffers more interruption. Some tasks are typically clerical (e.g. typing, faculty assistants' duties, etc.) and it is interesting to note to what extent these are performed by quite senior staff. Finally at the bottom of the table figures for time off are given. These are calculated from the total diary time, as opposed to AWT. The timing of the survey accounts for slightly more annual leave being taken than normal. Time off includes some unpaid time, i.e. lunch and evening breaks (9.3 per cent of all recorded time). If these are excluded, then 13.1 per cent of *paid* staff time was not available for work (even interruptions) during the survey period. In fact annual leave alone accounted for most of time off: 10.9 per cent of paid staff time at June 1975 leave entitlements for those surveyed. If we assume four extra days consumed by sick leave, courses etc., for all grades except SO2 (five days), this brings the expected time off up to 12.5 per cent of paid time. Thus the survey, giving 13.1 per cent, shows a reasonably typical picture.

ACTIVITY n = minutes	*Typists* % n = 30,000	*CL1/2* % n = 154,837.5	*AP2/3* % n = 57,260	*AP4/5* % n = 69,206.25	*SO2* % n = 50,135	*Total* % n = 361,438.75
Liaison and administration (10–19)	10.9	8.4	11.9	23.5	32.9	15.4
(Consultation) (11)	(8.5)	(3.1)	(4.7)	(7.9)	(11.0)	(5.8)
Book acquisitions (21–25, 29)	—	10.1	9.1	1.2	3.2	6.4
Processing (26)	—	5.3	—	0.3	—	2.3
Binding (27–28)	—	3.2	—	0.1	—	1.4
Periodicals (31–33)	—	6.8	0.2	—	—	3.0
Other technical services (35–37)	—	1.5	0.1	—	—	0.7
Cataloguing and classification (41–49)	—	4.5	58.0	16.2	8.4	15.4
Desk duties (50–52, 59)	—	23.0	1.6	8.0	4.7	12.3
Reader service duties (53–58)	—	4.8	1.0	1.7	0.5	2.6
Reservations and ILL (61–63, 69)	—	5.1	3.4	—	0.3	2.8
Shelving (64–68)	—	10.2	7.1	8.0	6.6	7.9
Book selection (71)	—	—	—	5.7	10.0	2.5
Information work (72–76)	—	1.2	0.3	24.2	22.6	8.4
Faculty assistance (77, 79, 100)	—	8.9	—	1.8	4.1	4.7
Typing (81–88)	83.5	0.5	0.1	0.1	—	7.2
Balance (04, 07–09, 78)	5.6	6.6	7.2	9.4	6.7	7.2
TOTAL	100.0	100.1	100.0	100.2	100.0	100.2
Time off (01–03, 05, 06)	14.4	23.2	18.4	23.0	19.3	21.2
	n = 35,025 min	n = 201,645 min	n = 70,125 min	n = 89,925 min	n = 62,110 min	n = 458,830 min

Note: The code numbers are identified in Appendix I, and are grouped in this way in Tables 9 and 10. Staff graded AP3/4 have been grouped with AP4/5.

TABLE 1: *Available working time, by grade, all libraries (percentages)*

Unit times

Table 2 gives the unit times for those tasks where counts were made for all weeks. In some cases more than one task contributed to the production of units of work. For instance accessions queries result in books accessioned as well as accessioning. Times from both activities have been set against the number of items accessioned. Also a unit time is given for the whole cataloguing process including checking, filing and co-ordination. In all cases the times have been taken from the diaries so as to relate closely with the units produced. Therefore some 'catalogue checking' has been excluded from the 'whole cataloguing process' unit time, where it was concerned with re-cataloguing rather than original cataloguing. The figure for issues is more or less notional, since staff recorded time spent manning the issue desk, rather than time actually assisting a user with an issue or return. The later studies in 1976 indicated that

	Minutes	*Items*	*M/I*
Ordering—requisition cards	5,717.25	1,976	2.9
Unpacking—volumes unpacked	3,948.75*	1,333	3.0
Government Pubs.—items accessioned	1,160.00	675	1.7
Accessioning and queries†—items accessioned	8,112.82	2,474	3.3
Withdrawing order cards	1,322.5	1,209	1.09
Processing—volumes processed and ready for shelves	6,846.00	2,584	2.7
Processing—teaching resources	1,001.25	360	2.8
Processing—audio-visual	160.5	16	10.0
Binding—volumes sent for binding	3,780.00	810	4.7
Periodicals—periodical parts received	7,142.04	3,230	2.2
BNBC—volumes prepared for dispatch	559.00	128	4.4
Cataloguing—proformas prepared	20,537.5	1,376	14.9
Cataloguing—audio-visual	253.00	21	12.1
Cataloguing—teaching resources	479.93	360	1.3
Duplicates—sets of cards typed	3,612.75	387	9.3
Discards—sets of cards withdrawn	809.5	235	3.4
Co-ordination—titles checked	4,820.75	712	6.8
Re-cataloguing—titles checked	7,972.00	666	12.0
Complete cataloguing process	36,249.75	1,376	26.3
Issuing books to readers—items issued	30,818.14	19,991	1.5
Discharging returned books—items returned			
Overdues—items found overdue	1,545.25	307	5.0
Photocopying—copies made	2,996.64	5,226	0.6
Internal reservation—reservation cards	3,327.25	246	13.5
ILL requests from other libraries			
ILL requests—applications made	5,874.25	173	34.0
Typing—catalogue card sets	20,167.5	2,107	9.6
Typing—subject index cards	667.5	373	1.8
Typing—cards sets	20,835.00	2,480	8.4
Typing—ILL forms	728.75	173	4.2

* Weeks 1–3 only, week 4 figures were not available.

† If queries are excluded the unit time drops to 1.9 (4,798.82 ÷ 2,474)

TABLE 2: *Unit times, all weeks, all libraries*

issuing a book to a reader and discharging it each take about 30 seconds. From the user's view point returning a book takes 24 seconds but taking it out takes 1½ minutes: the issue system is due to be automated next year.

Tasks not given unit times

Some tasks, typically information and enquiry work, do not result in readily countable units of work. In these cases we are concerned only with the proportion of time spent on these activities, and it is particularly useful to compare time spent on 'common' or 'interruption' activities, that is, time not available for one's primary task within the library. Overall 40 per cent of available working time is 'lost' to primary task areas (acquisitions, cataloguing, information work etc.) and given to common tasks such as desk duty, shelving and processing, or to liaison with others or in personal breaks. This loss is higher for clerical staff and lower for junior professional staff (53 per cent and 25 per cent respectively). Senior professional staff 'lose' 38 per cent of their time this way since more of their time is taken up in various types of liaison. This should be regarded as a necessary part of their work but one which does not contribute directly towards any tangible output.

Journeys

As noted above we investigated the loss in available working time caused by journeys between site libraries. This accounted for less than 1 per cent of available working time, but 1.5 per cent of senior staff time. There were 341 journeys noted, or 17 a day over the survey period (Table 3). Most journeys were between the main library and a branch, not between branches, and were therefore short (10 minutes roughly). What cannot be judged from this survey is the detriment to the library by physical separation of staff and stock; if there were not this barrier to communication, would there be any improvement in service? In an inter-disciplinary institution, there should be the greatest possible opportunity for contact between parts of the library. This at present appears to be impeded by physical separation, as demonstrated by a relatively small number of journeys.

	Main Library	*Lipman Library*	*Science and Technology Library*	*Total*
CL1/2	66	5	27	98
AP2/2	27	5	7	39
AP4/5	56	7	31	94
SO2	23	56	31	110
TOTAL	172	73	96	341

TABLE 3: *Journeys for staff at each grade, by library*

Individual departments

Acquisitions

Six tasks were identified in this department. Of these one is performed by various staff not formally attached to the department, namely book ordering. The remainder are performed mainly by clerical staff, although responsibility for liaison with book suppliers (book ordering, accessions queries) is performed at junior professional level. It should be noted that during the period of survey one task, withdrawing completed order cards, was neglected due to shortage of staff. A later check has indicated a unit time for this, from which a corrected picture of the department's work can be given. In this and the following sections the time spent on each departments' work is treated as a whole, rather than part of a wider timetable. Thus we can compare the proportions of time taken within a department on particular tasks, and the contribution of different grades of staff to particular tasks. Table 4 describes acquisitions in these terms.

ACTIVITY n = minutes	*CL1/2* n = 15,575.5	*AP2/3* n = 5,207	*AP4/5* n = 794.82	*SO2* n = 1,601.25	*Total* n = 23,178.57
Ordering	13.24	44.47	26.1	75.4	25.0
Unpacking	25.29	10.13	40.26	9.67	21.32
Accessioning	40.88	8.11	22.08	—	30.05
Accessioning queries	13.1	22.03	4.46	14.91	14.94
Withdrawing order cards	3.8	—	7.07	—	2.79
Filing (all acq. processes)	3.65	15.24	—	—	5.87
TOTAL	99.96	99.98	99.97	99.98	99.97

TABLE 4: *Acquisitions tasks, by grade (percentages)*

Technical services

Technical services embraces book acquisition, binding, processing, periodicals, book exchange, stationery and cataloguing. Cataloguing and acquisition are treated separately, but as staff in these sections have related and sometimes overlapping duties, it is worthwhile to show all technical services tasks together (Table 5). Processing is a task common to all junior staff, but the others are normally performed by specific people. During the period of survey there was little intervention in any of these areas by the senior librarian in charge of technical services, except for accessions queries; discussion and supervision of these activities will have been counted as consultation.

Cataloguing

Original cataloguing is mostly done by junior professional staff, re-cataloguing is shared by them with more senior staff, and duplicates and withdrawals are delegated to clerical staff. Checking copy occupies 25 per cent of the time spent on the original task. Two other support tasks were identified, catalogue coordination and filing. The former is mainly performed by a senior member of

	CL1/2 n = 41,551.54	*AP2/3* n = 5,407	*AP4/5* n = 1,094.07	*SO2* n = 1,616.25	*Total* n = 49,668.86
Ordering	4.96	42.83	18.96	74.7	11.66
Unpacking	9.48	9.75	29.24	9.59	9.95
Accessioning	15.32	7.81	16.04	—	14.02
Accessioning queries	4.91	21.21	3.24	14.77	6.97
Withdrawing order cards	1.42	—	5.14	—	1.3
Processing	19.68	—	19.58	—	16.89
Binding despatch	10.08	—	5.48	0.92	8.58
Binding receipt	1.8	—	—	—	1.51
Filing (all acq. processes)	1.36	14.68	—	—	2.74
Periodicals—ordering	6.87	—	—	—	5.75
Periodicals—receipt	16.86	2.35	0.45	—	14.37
Periodicals—filing	1.55	—	—	—	1.29
Stationery routines	4.12	—	0.45	—	3.45
Packing boxes	0.18	1.34	1.37	—	0.32
BNBC routines	1.34	—	—	—	1.12
TOTAL	99.93	99.99	99.95	99.98	99.92

TABLE 5: *All technical processes, by grade (percentages)*

the team, and, as Table 5 shows, occurs for about half the number of titles catalogued. At present staff originating copy perform their own filing, although some is delegated to junior staff (subject index and classified cards). This results in a surprisingly high proportion of the two senior cataloguers' time being spent in this clerical operation (Table 6).

Readers' services

For various reasons this department is probably least well described by the survey. Its tasks are more subject to seasonal variation (overdues, registration

ACTIVITY n = minutes	*CL1/2* n = 7,031.5	*AP2/3* n = 33,231.5	*AP4/5* n = 11,196.93	*SO2* n = 4,187.5	*Total* n = 55,647.43
Cataloguing	1.43	58.82	18.08	—	38.94
Indexing	2.13	3.36	2.58	0.47	2.83
Duplicates routines	46.18	0.55	2.13	—	6.59
Discards routines	7.25	0.1	2.02	0.89	1.45
Co-ordination	—	3.19	33.19	1.83	8.72
Re-cataloguing	0.53	13.12	3.46	77.31	14.42
Checking (all TS processes)	13.51	13.62	23.35	15.05	15.67
Filing	28.94	6.92	15.15	4.41	11.17
Relegation routines	—	0.29	—	—	0.17
TOTAL	99.97	99.97	99.96	99.96	99.96

TABLE 6: *Cataloguing tasks, by grade (percentages)*

and missing book routines all occur infrequently but consume long periods of time when performed). More serious, the instructions for completing diaries, being designed for ease of completion, did not require fine discrimination between manning issue or enquiry desks and actually issuing or discharging books or answering enquiries. While a member of staff was manning a desk but engaged on his own work he noted down the two appropriate codes and the time was divided between the two activities. Some conscientious members of staff noted down each change in activity, resulting in a better allocation of time, but this was not always feasible. Therefore the time recorded for manning the service desks bears little relation to the actual tasks of issue or enquiry. Furthermore this will affect to some extent the time recorded for those other tasks performed while manning issue desks. Against this must be set the fact that the study surveyed a period with low library use. The method of data collection simulated a period of medium library use by allocating more time to desk duties. Therefore the proportions of time shown by the study can be accepted with confidence. The only unit time to be seriously affected (apart from issues) is processing. The 1976 observation study, which took place during a busy period in the middle of the academic year, gave no evidence that the earlier study was misleading. Most readers' services tasks are performed by clerical staff: the fact that a low proportion of junior professional staff time is spent on desk work probably accounts for their overall high proportion of time spent on their 'own' tasks (see above). Junior professional staff are mainly used to deal with external loans, although they contribute only 30 per cent of the time required by this task. The comparatively high proportions of middle professional staff time spent on overdues and photo-copying relate to administration and liaison duties which these tasks generate. Table 7 details the proportions of time.

ACTIVITY n = minutes	*CL1/2* n = 50,943.74	*AP2/3* n = 3,390	*AP4/5* n = 6,687	*SO2* n = 2,791	*Total* n = 63,811.74
Issue desk duties	50.65	4.38	51.57	50.69	48.29
Enquiry desk duties	16.17	22.32	29.46	34.36	18.69
Filing	2.99	—	2.52	—	2.65
Overdue routines	2.3	—	5.58	—	2.42
Photocopying	4.66	4.35	6.23	2.01	4.69
Set text maintenance	3.56	0.22	0.22	2.59	2.99
Registration	0.31	—	0.11	—	0.26
New book display	0.88	9.14	1.4	2.5	1.44
Missing book routines	2.98	2.8	2.57	2.14	2.89
Internal reservations	6.48	0.44	—	0.26	5.21
External borrowing	7.89	49.86	0.18	5.37	9.2
Reservation enquiries	0.56	5.58	0.11	—	0.75
Filing (ILL reserves)	0.51	0.88	—	—	0.45
TOTAL	99.94	99.97	99.95	99.92	99.93

TABLE 7: *Readers' services tasks, by grade (percentages)*

ACTIVITY n = minutes	*CL1/2* n = 16,125.75	*AP2/3* n = 300.5	*AP4/5* n = 24,205.75	*SO2* n = 21,753.05	*Total* n = 62,385.05
Book and periodical selection	—	—	16.24	22.93	14.29
Dissemination	3.56	5.4	23.24	12.47	14.31
Enquiries (subject)	6.26	48.83	25.52	20.18	18.79
Display work	1.95	9.98	4.19	2.22	2.95
Teaching information	—	—	2.49	2.14	1.71
Stock editing	0.12	—	4.66	15.15	7.12
Publications	—	—	8.97	—	3.48
Faculty assistance	75.83	—	2.76	9.34	23.93
Filing information services	9.3	—	0.16	0.13	2.51
Audio-visual prep. and maintenance	—	—	2.07	—	0.8
External liaison	2.94	35.77	9.64	15.4	10.04
TOTAL	99.96	99.98	99.94	99.96	99.93

TABLE 8: *Information work, by grade (percentages)*

Information work

The main point emerging from Table 8 is that the stock control part of information work (book selection, stock editing and (Table 5) book ordering) is performed by the senior professional staff (faculty librarians) while the middle range (subject specialists) concentrate on exploitation, that is, scanning and dissemination, enquiry work, teaching and publications. As with readers' services work, this group of tasks is subject to seasonal changes, so that this particular period may not represent the year's activity.

The data put to use

Long-term planning

To illustrate the use of the data in estimating the number of staff to be allocated to a specific department we take acquisitions:

STEP 1. Specify the annual work-load: 25,000 accessioned items.

STEP 2. Identify unit times where appropriate (in this case all stages of work can be given unit times):

Ordering	2.9 min.
Unpacking	3.0 min.
Accessioning and queries	3.3 min.
Withdrawing cards	1.1 min.
Filing	0.7 min.

STEP 3. Calculate time required to process work-load:

Ordering	72,500 min.
Unpacking	75,000 min.
Accessioning and queries	82,500 min.

Withdrawing cards	27,500 min.
Filing	17,500 min.
Total	275,000 min.

STEP 4. Identify common or shared tasks. Ordering is combined with bibliographic checking and partly performed by information staff. We assume an even distribution between information and acquisitions staff: 72,500/2 = 36,250.

STEP 5. Re-calculate time required for acquisitions staff to process work load: 275,000 − 36,250 = 238,750.

STEP 6. Specify nature of staff required: junior professional supervision with clerical support.

STEP 7. Identify AWT and amount of time available for their primary task (PTT).
AWT: 87 per cent of complete year (52 weeks) = 45 weeks
Junior professional: PTT 75 per cent of AWT
Junior clerical: PTT 50 per cent of AWT

STEP 8. Calculate AWT and PTT:
AWT 37.5 × 60 × 45 = 101,250 minutes AWT
Junior professional 101,250 × 75/100 = 75,937.5 minutes PTT
Junior clerical 101,250 × 50/100 = 50,625 minutes PTT.

STEP 9. Divide time calculated in Step 5 among required staff:
(i) Subtract junior professional PTT
238,750 − 75,937.5 = 162,812.5 minutes;
(ii) Divide remainder by junior clerical PTT
162,812.5/50,625 = 3.2.

RESULT. To process a work load of 250,000 accessioned items with the present pattern of staffing requires one junior professional and the primary task time of over three junior clerical staff.

NOTE: The proportion of time available for a person's primary task (Step 7) will vary as the number of staff rises above or falls below the level obtained during the survey. This is because common tasks (manning service points and coping with library user demand) have first priority in staff work allocation, and time for primary tasks must come from what remains.

Short-term planning

To illustrate how staff may be re-deployed to make the most of an unsatisfactory level of staffing, we develop the point made immediately above and calculate what staff to allocate to each department while coping with a set load.

STEP 1. Calculate time required to process annual work load in all departments. This involves steps 1–3 of the above; and for tasks without unit times, multiplying time revealed by work study by 13 (the survey took 4 weeks, i.e. 1/13th of 52).

STEP 2. Identify common tasks. At present these are processing, service desk manning, shelving, shelf straightening and clearing up.

STEP 3. Calculate AWT for staff available.

STEP 4. Calculate proportion of AWT to be deducted for consultation, travelling, tea breaks etc. (about 11.6 per cent is suggested by the full survey data).

STEP 5. Calculate proportion of AWT to be deducted for administration and liaison. For a staff surveyed of 46 FTE this was 9.6 per cent.

STEP 6. Deduct from AWT (Step 3):
(i) Common tasks (Step 2);
(ii) Balance time (Step 4);
(iii) Administration and liaison (Step 5);
(iv) Other specialized tasks, e.g. typing, graphic design.
The remainder is the time available to the various departments, PTT, or Primary Task Time.

STEP 7. Calculate the proportion of PTT consumed by each department in Step 1.

STEP 8. Allocate available PTT (Step 6) according to the proportion in Step 7.

STEP 9. For each department identify permanent staff (i.e. professional and/or senior staff). Subtract their individual PTT (calculated as before, Steps 7–8).

STEP 10. Allocate mobile staff (i.e. junior or non-specialized staff) to consume remaining time (as in the long-term exercise, Step 9).

Comment

Whereas, in a situation of inadequate staffing, there can be no way of avoiding a drop in service standards, and in output, the above procedure should keep work flowing evenly through the system, while permitting essential work to proceed. Backlogs will develop, but will be small and spread over all departments. Clearly a major backlog could be eliminated by changing the status of task concerned from primary to common, so that all staff would help to eliminate it.

Comparisons

It is virtually impossible to make meaningul comparisons with other surveys without an intimate knowledge of the systems surveyed. Nevertheless in Table 9 we compare proportions of time spent and unit times with the City of London Polytechnic 1973 survey, and Woods' Southampton costing study for one group of processes (cataloguing). The similarities are striking. We note that in one area where a large proportion of staff time is spent (cataloguing) Newcastle compares favourably with other libraries. Figures of unit times for university libraries quoted in Smith and Schofield[5] confirm this picture.

Conclusion

The 1975 work study was by no means perfect: its timing, and one aspect of its data collection have required follow-up studies using more precise methods. Nevertheless these confirmed the original result. Comparison with other studies shows that the data were fairly reliable, and it has not required much effort to enrich them. From the data we have been able to plan staffing for various work-loads, and to adjust work distribution with differing staff numbers.

	Proportion of AWT (%)		*Unit times (minutes)*				
n = minutes	*Newcastle* n = 361,438.75	*CoLP* (1973) n = 171,185	*Newcastle*	*CoLP*	*Southampton*	*Clmru-Lib. Q*	*Lib. R*
Liaison + administration	15.4	16.6	—	—	—	—	—
(Consultation)	(5.8)	(10.7)	—	—	—	—	—
Book acquisitions	6.4	5.5	—	—	—	—	—
Unpacking			3.0	2.3	—	38.0	33.0
Accessioning			3.3	4.1	—		
Processing	2.3	5.7	2.7	5.3	—	—	—
Binding	1.4	5.5	—	—	—	—	—
Periodicals	3.0	5.0	—	—	—	—	—
Other technical serivces	0.7	0.2	—	—	—	—	—
Cataloguing + classification	15.4	13.7	14.9	16.5	21.7	69.0	64.0
Duplicate cataloguing			9.3	5.0	—		
Checking + filing			8.0	7.4	7.2		
Desk duties	12.3	9.2	—	—	—	—	—
Reader services duties	2.6	3.4	—	—	—	—	—
Overdues			5.0	2.3	—	—	—
Reservations	2.8	4.6	13.5	4.0	—	—	—
ILL applications			34.0	14.8	—	100.0	71.0
Book selection	2.5	9.2	—	—	—	—	—
Information work	8.4	7.4	—	—	—	—	—
Faculty assistance	4.7	—	—	—	—	—	—
Typing	7.2	0.3	—	—	—	—	—
Balance	7.2	7.4	—	—	—	—	—
TOTAL	100.2	100.1					

TABLE 9. *Comparison of Newcastle and City of London Polytechnics with selected data from other surveys*

We have also been able to pinpoint work done by grades of staff and so redeploy them in the face of staff shortages. No costing calculations have been performed, but this simply requires salary figures to complete the exercise. Above all, a realistic picture of staff activity has been given, taking interruptions, shared tasks and primary tasks into consideration.

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A copy of the Research Note on which this article is based is held in the Aslib Library. Further copies may be obtained from the author.

APPENDIX 1

Work codes, amended definitions

GENERAL CODES

01 Annual leave.
02 Sick leave.
03 Other leave, time off in lieu, visits, fire practice, staff photo.
04 Travelling time, collecting pay.
05 Lunch break.
06 Tea break.
07 Coffee, afternoon tea, presentations, car moving.
08 Looking after sick staff.
09 Tea making, washing up, collecting milk, etc.

ADMINISTRATIVE WORK

10 Personal admin., general admin., distributing forms, completing forms (leave), clearing out files, tidying desk, tidying duckets.
11 Consulting (with other members of staff). New library discussion. Looking for staff.
12 Meetings (formal).
13 Training sessions.
14 Telephone conversations (making and receiving).
15 Correspondence (opening and answering).
16 Work allocation, timetabling, staff assessment.
17 Budgeting, financial work, counting photocopying money.
18 External liaison, reception, guided tour of library.
19 Planning, report writing, statistics, proof reading, publications (if not subject work).

TECHNICAL SERVICES I: ACQUISITIONS

21 Ordering, batching, dispatching routines (including initial check of order files by FA) collecting requisition sheets.

22 Unpacking, checking order file.
23 Accessioning, labelling, including BS work, donations list
24 Queries, booksellers reports.
25 Withdrawing order cards (including sorting).

TECHNICAL SERVICES II: PROCESSING
26 Processing, heat press.

TECHNICAL SERVICES III: BINDING
27 Dispatch.
28 Receipt.
29 Filing (all acquisitions I–III processes), sorting accession cards.

TECHNICAL SERVICES IV: PERIODICALS
31 Ordering and claims.
32 Receipt, circulation, etc.
33 Filing, amendments, up-dating, checking for new titles, disposing stock.
34 Periodicals information, up-dating of holdings for NRLB.

TECHNICAL SERVICES V: OTHER TECHNICAL SERVICES PROCESSES
35 Stationery routines including cutting scrap.
36 Packing/unpacking boxes for transit.
37 BNBC routines.

TECHNICAL SERVICES VI: CATALOGUING, ETC.
41 Cataloguing, classification, drafting proforma (including queries).
42 Indexing (subject index).
43 Duplicates routines.
44 Discards routines.
4R Relegation routines.
45 Cataloguing co-ordination/consultation.
46 Re-cataloguing.
47 Checking (all technical services processes) including accession lists.
48 Splitting catalogues.
49 Filing.

READERS SERVICES: I
50 Issue desk queries.
51 Issue desk duties, including set text and stack issues.
52 Enquiry desk duties. Filling photocopying machine and enquiries.
53 Overdues.
54 Photocopying.
55 Set text maintenance (including FA duties).
56 Registration—bundling tickets.
57 New book display.
58 Missing book routines including checking misplaced slips in issue.
59 Filing—including sorting pockets, cutting cards for issue guides, Letraset.

READERS SERVICES: II
61 Internal reservations, ILL loans.
62 ILL requests, including clerical work, e.g. stamping stationery, dispatching RLB cards.
63 Reservations enquiries.
64 Clearing up.
65 Shelving including sorting and stack.
66 Shelf straightening (66AV = room shelf straightening).
67 Erecting shelving and collecting furniture.
68 Library removals.
69 Filing (ILL, reserves, etc.).

INFORMATION WORK

71 Book, periodical selection, evaluation of new journal format, preparation for course.
72 Dissemination (scanning, profiles, SDI, bibliographies) newspaper cuttings.
73 Enquiries (all subject enquiries answered by any staff). Other enquiries should be coded appropriately.
74 Display work (planning and mounting).
75 Teaching information use (*formally*) including preparation. (Informal 73.)
76 Stock editing (including choice of stock for binding, BNBC, withdrawal, etc.). Checking acquisitions for urgent duplicates.
77 Faculty clerical duties, preparation for meetings, lectures, prep. indexes for binding.
78 Personal current awareness.
79 Filing (information services, e.g. EXTEL).
7X Publications (subject work) including checking typing and items for possible publication.
100 AV preparation and maintenance.

TYPING

81 Catalogue cards.
82 Accession lists.
83 Letters.
84 Reports, others.
85 Subject index cards.
86 POL orders.
87 Corrections and additions.
88 ILL forms.

APPENDIX 2

Internal consistency

This type of survey cannot be subjected to statistical checks for reliability and validity. However, we can indicate the quality of the data by internal comparisons There was considerable fluctuation from week to week in the unit times recorded. However, the proportion of time spent on tasks remained stable from one half of the survey to another (Table 10). Another check was made by comparing the estimate of a year's work from the work study's unit time for one department (cataloguing) with an independent study of cataloguing throughput in 1975.

(i) *Work study, catalogue output estimate*
Unit time (UT): 26 mins
Number of cataloguers (N): 8
Grade: Junior professional ∴ PTT = 75 per cent AWT
PTT = 75,937.5 min. p.a. (see 6.1, Step 8)
Output = PTT × UT × N = 23,365 titles

(ii) *Cataloguing output study, estimate*
Unit time: 81 titles per 'cataloguer week'*
Number of cataloguer weeks (CW) p.a.: 45.5 (AWT) × 75 per cent = 34.12
Output = CW × UT × N = 22,113 titles

Given the rather loose definition of a 'cataloguer week' the two estimates are fairly close to each other. The situation is complicated in that original cataloguing is actually performed by both full- and part-time staff, and at various grades.

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* A cataloguer week is that part of a 'cataloguers' week' spent on original cataloguing.

ACTIVITIES n = minutes	*Weeks 1 and 2* n = 177,138.75	*Weeks 3 and 4* n = 184,300.0
Liaison and administration	15.0	15.8
(Consultation)	(6.5)	(5.1)
Book acquisitions	6.4	6.4
Processing	2.8	1.8
Binding	0.8	2.0
Periodicals	2.5	3.3
Other technical services	0.6	0.8
Cataloguing and classification	15.4	15.4
Desk duties	12.6	12.0
Reader service duties	2.3	3.0
Reservations and ILL	2.7	2.9
Shelving	8.0	7.9
Book selection	3.4	1.6
Information work	9.2	7.5
Faculty assistance	3.9	5.5
Typing	7.3	7.1
Balance	7.3	7.0
TOTAL	100.2	100.0
Time off	n = 230,755 23.2	n = 228,075.0 19.2

TABLE 10: *Comparison of first and second fortnights of the survey: proportion of AWT (percentages)*

Self-teaching and the development of the individual

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Paper presented at the Aslib Northern and Midlands Branch Joint Annual Conference, Windermere, 6th–8th May 1976.

THE TRADITIONAL CONCEPT of teaching places the emphasis and responsibility for teaching firmly on the teacher, casting the student in the role of passive listener and the library in the role of passive provider and collector of reference materials.

If we begin with the premise that all students are individuals and that the main purpose of higher education is the development of the individual, then it is obvious that any teacher-centred approach is likely to be inadequate.

In the last ten to sixteen years there has been an increasing awareness that the education process should be learner- rather than teacher-centred. As a result, there is an increasing emphasis on the teacher as manager and the library as a resource for the student, a resource which can and should play an important part in developing intellectual and professional skills.

This development of the individual is seen as one of the main purposes of higher education in the final report of the Carnegie Commission in Higher Education, that is, the need for 'advancing the intellectual and professional capacity of individual students within a constructive campus environment'.[1]

I have used the term self-teaching in the title of my paper to emphasize not only that the learner is the focus, but that the learner must take an active responsibility for his own development.

This active involvement of the student was one of the central tenets of the programmed learning movement which reached its peak in Britain in the 1960s. Principles of programmed learning involved active involvement of the student in a sequential progression of learning material, but gradually there was a realization that the focus of the programmed learning movement was too narrow,[2] and its techniques and principles are now seen in the wider context of course development.

A typical example of the steps in the preparation of programmed material can be found in the 1967 Year Book of the United States National Society for the Study of Education:[3]

i. the formulation of objectives
ii. the design and testing of criterion measures to determine when the objectives have been achieved
iii. the definition of the target population
iv. the analysis of the learning tasks

Aslib Proceedings, 28 (9), September 1976, p. 305–313. Printed in Great Britain

v. the preparation of the programme
vi. testing and revising the programme
vii. the validation of the programme

Some of those present will recognize in this a form of the systematic approach which has been advocated for use by producers of tape/slide materials in the SCONUL scheme. These seven steps form what is now sometimes called a systematic approach to course development; these have been applied not just to the preparation of materials for library instruction, but for the development of course materials in a variety of areas.

This approach can be considered in terms of three basic steps:

1. A careful analysis of course material to define what the learner should achieve (OUTCOMES).
2. A consideration of the methods and techniques available for the course (METHODS AND TECHNIQUES).
3. An evaluation and revision of the course in terms of the level of achievement set for the course (EVALUATION).

There is at the present time a lack of definitive research evidence in the area of course development, but a systematic approach of this kind offsets this since it tests course materials with students in the practical situation enabling improvements to be made after judging their performance in terms of the levels of achievement set.

Let us consider these three steps in more detail.

Outcomes

Those of you who know Mager's excellent little book on instructional objectives will remember the moral of the seahorse story: 'If you are not sure where you are going, you are liable to end up some place else.'[4] This points the need for the person designing instructional material to be very clear about the intended outcomes, the objectives of the material.

The desirable outcomes of library instruction appear to fall neatly into the two main classes of objectives classified by Benjamin Bloom and his associates,[5, 6] namely the affective domain and the cognitive domain.

The affective domain is so called because many introductory orientation programmes are designed to make the student feel familiar with and 'at home' in the library and to make him feel that it can be a good place to work in; the cognitive domain, because the use of the catalogue and of a variety of library tools can be analysed into a sequence of knowledge skills.

Instruction in the use of library tools has an important advantage over the work given in many academic courses, namely that it is concerned with specific skills and techniques. This means that you know when a student has grasped a particular piece of instruction because he can go ahead and actually use a particular library tool. This is why the three stage systematic approach is appropriate for this area of library instruction.

Methods and techniques

There is now available a wide range of methods and techniques which can include everything from a straight lecture to a number of alternative forms of instruction and many different audio-visual techniques.

The lecture, like a tape/slide sequence used on its own, can do little more than present information to a passive student. The alternative forms of instruction now in use all involve the student actively and can help him to take responsibility for his own progress. Since there are a number of basic forms of these and their use is extensive in America and is growing almost daily in this country, I should like to describe four of these. The first two came from America and the other two originated in their present form in Britain.

The Postlethwaite Audio-Tutorial Approach

The systematic approach initiated by Professor Postlethwaite in 1962 in a biology course was first called an 'integrated experience approach', but has since been termed 'the audio-tutorial approach'. It can be summarized into three major study sessions:

1. A General Assembly Session (GAS) scheduled for one hour per week for all students.
2. An Independent Study Session (ISS) which can be taken at any time (7.30 a.m.–10.30 p.m.)—equivalent to four hours of conventional instruction—involving all students in an audio-tutorial study.
3. An Integrated Quiz Session (IQS) scheduled for one hour per week and involving eight students.

The essence of this system is in the combination of group activities with independent work.

The General Assembly Sessions are given over to lectures either by the senior instructor or visiting lecturers, and the Integrated Quiz Sessions are based on the premise that students will learn by having to teach a subject. Thus it allows a student to teach what he knows about work conducted during the week. The Independent Study Session is the flexible, independent study part of the system; for this the student uses an individual booth which is equipped for him to play audio-tapes and view tape/slide materials, conducting individual experiments as appropriate.

Study is managed in weekly sessions and new material is provided each week. The ISS allows the student to proceed at his own pace, repeating material if necessary until the week's task is mastered.[7]

The Keller Plan

A second American system which has emerged was described in a paper by Professor F. S. Keller, entitled 'Goodbye Teacher . . .'.[8] Concerned initially with a psychology course the system advocates the use of a sequential set of self-study units pursued by each student at his own pace. A student must demonstrate mastery of a unit by means of a written test before going on to the next unit. The test is immediately marked and problems and errors discussed with a student tutor. If the student fails the test he must study the material again before trying another test on the same unit. Failure to pass tests even on the third attempt or even later is not held against a student, and grade assessment of a course is divided into three parts—final examination, laboratory exercises and self-study units.

A number of other systems have been used often with a high media component and often patterned on one of the systems previously described.

The other two methods that I should like to describe are the Open University system and my own work at the University of Surrey.

The Open University

The method used here has been described as 'an integrated multimedia system'.[9] In his explanation of the method Pentz indicates that a course consists of 34 course units made up of correspondence texts, prescribed sections of set text-books, associated loose-leaf materials and self-assessment tests. Tests are related explicitly to lists of behavioural objectives, continuous assessment being used with a system of academic counsellors and correspondence tutors.

Five per cent of the total learning time for a student is taken up with one half hour's television transmission on BBC 2 for each course unit (there is a repeat of the programme at a different time each week). For students without BBC 2, study centres are provided at different localities. Study centres also have copies of the programmes available on film. Intensive summer schools are held. The system is basically an attempt to integrate television programmes with a highly efficient correspondence course, with emphasis on as much student–tutor contact as possible.

It may be that ultimately Open University developments will do more to promote an awareness and use of alternative methods of instruction in higher education in this country than any other single factor.

A self-teaching system

My own work at the University of Surrey, which is documented in three key papers,[10, 11, 12] was concerned to produce a support system to a traditional lecture course and as such used the library as a central base for materials used. This was developed and tested mainly with a first-year electrical engineering course.

At the beginning of the course the student completed a pre-knowledge test for which he was given an answer sheet enabling him to mark the test immediately and to look up areas of knowledge in which he was deficient. Self-tests on the same lines were given at intervals throughout the course so that the student was able to assess his own performance. By reference to library-based reference material keyed into the answers to the tests the student was able to remedy any lack of knowledge.

Materials additional to the lectures were in three main forms: books, tape recordings of lectures with diagrammatic and other notes, and tape/slide presentations—all available at the library issue desk.

If the student had problems which could not be fully solved with the library-based material then he could raise them in the tutorial sessions. Copies of the self-test answers were handed in by students. These were then computer processed and summarized information on general areas of difficulty were circulated to course tutors on the day after each self-test.

My intention in this paper is to give you some indication of recent developments in methods and techniques since this has implications for the library both in terms of the materials required and the type of user education given. Therefore to show the extent to which these methods or variations of them are being used in this country I have included five recent British references which should give a good indication of the scope of activity.[13, 14, 15, 16, 17]

We could of course explore each of the techniques described in detail and look at the various individual methods used within them but in the limited time that we have available I should like to turn specifically to a consideration of the tape/slide method since this is the central concern of the SCONUL Tape/Slide scheme.

The tape/slide method

At the beginning of my own work in this field and at the beginning of the SCONUL tape/slide scheme, published information on the use of tape/slide materials came mainly from medical sources, for example at the University of Glasgow Department of Medicine Gardiner Institute.[18] The use of audio-tape for medical instruction was largely pioneered in this country by Doctors J. and V. Graves who run the Medical Recording Service Foundation which is a non-profit making activity of the Royal College of General Practitioners and provides teaching material in the form of audio-tapes and tape/slide materials on long or short term loan. A report of a medical audio-tape conference held in 1970 indicated that even at that time the scope and use of tape and slide materials in medical education was considerable.[19]

Tape/slide materials are now in use in a variety of subjects and in addition to the library field my own experiences have been in the field of food preparation, electrical engineering, chemistry, education and medical physics.

In the SCONUL scheme for example there are now 16 tape/slide guides available and a further 14 are in active preparation, a number of these now being in the final stages. Also another round has just been launched consisting of another possible 12 tape/slide guides. In addition many libraries have their own locally produced tape/slide material on an introduction to their own libraries and to the publications that they hold.

This wide use of tape/slide materials tempts one to ask what is the reason for this popularity. There is certainly no definitive research that says that the tape/slide method is better than other audio-visual methods, video-tape, ciné film, etc. Research is going on which may produce guiding principles for media research, for example that reported by Hawkridge at the Open University[20]—this reference contains a summary of work in this area but at the moment the principles are little more than rule of thumb.

The most obvious differences between the use of tape/slide material and video-tape or ciné film is that of having a still picture and a moving image but unless a skill involves movement the use of still pictures would seem sufficient. Simple principles in the preparation of visuals and audio-tapes were given in the SCONUL booklet 'Tape/Slide Presentations: Recommended Procedures'[21] and a revised and enlarged version of this should be available later this year.

In the absence of principles for using tape/slide material concerned with its effectiveness for learning, one then looks at it in terms of cost, ease of preparation and use, flexibility and other largely administrative features. That tape/slide materials are relatively easy to make and use, that they are flexible in that they can be revised and updated are factors that are undeniable. They are also of relatively low cost and the equipment for their use is reasonably well standardized, thus allowing for interchange of materials between institutions. These factors could well account for the popularity of the SCONUL tape/slide presentations and in some cases up to 100 copies of a presentation have been sold in this country and abroad.

Accepting that there is wide interest in these materials one must then look critically at how they are being used.

When the programmed learning movement was introduced into this country in the early 1960s the programmed learning method was thought by some to be the panacea for all ills—of course it wasn't. The same thing has been said of the tape/slide method, and of course it isn't. No method of itself can be a universal remedy for anything since it is not the method, but the quality of the learning material and the way in which it is used that is important.

Many, if not all, of the SCONUL tape/slide sequences present a reasonable survey of the subject that they are considering. Some present it well, others not so well. Some have good graphics and high quality audio recordings, others do not. However, many of them suffer from one major drawback, namely that in their original form they only present information.

This is equivalent to the traditional lecture where the lecturer presents information to a group of passive listeners. In the alternative methods examined earlier we have seen how these methods seek to involve the learner in his learning, how in the Postlethwaite method, for example, tape/slide material is used to give information, but this is then used in the context of practical work. What some SCONUL tape/slide producers and users of this material have found is that there is a need for a variety of other methods which actively involve the learner as well as present information to him.

This is the experience of other users of tape/slide materials, as for example in medical physics. Here the tape/slide material is designed to introduce people to the method of operation and characteristics of expensive equipment: for example, a device using ultrasonics to detect abnormalities in the eye.

Accompanying the tape/slide material which is used individually by the students is a carefully structured booklet which checks that the pre-knowledge of the student is sufficient before the tape/slide is used, provides a key to the technical phrases used, summarizes the content of the material and tests that the student has absorbed the important points.[22]

Typically, librarians I have talked to are using material in three main ways:

1. As material for their junior staff to increase their own knowledge in specific subject areas.
2. Held in the library for use by individual students as and when needed. Students' attention has been drawn to the availability of the tape/slide by a notice placed at the location of the material.
3. Used to show the scope and use of library materials to groups of students;

> a kind of initial familiarization which is later followed up with discussion, handout material and practical exercises. Roy Adams has used this approach with engineers at Trent Polytechnic and is shortly to publish an article in *Audio Visual Librarian* on the way in which he has constructed these teaching packages. This teaching package approach was also the subject of the recent SCONUL Tape/Slide Group seminar held at City University in March 1976.

It is easy to be critical of some existing SCONUL tape/slide material especially since in first round publications librarians were only just beginning to get used to the method and did not always have access to good audio-visual facilities. However, even with this qualification I think we should bear in mind that because of the SCONUL tape/slide scheme a large number of librarians have now been able to see what someone else feels is appropriate in a particular subject area. In this sense SCONUL tape/slide producers have stuck their necks out and have done what very few academic members of staff have done to date, that is, exposed their teaching methods to public view.

The other point is that one teacher often teaches in a way that differs from another and consequently in any educational field it is very difficult to generate material that can be used by teachers in different institutions. The SCONUL tape/slide material offers an opportunity to a librarian to see what someone else does and to alter or expand it to suit his own circumstances or methods of working. As we have already observed, the tape/slide method is flexible and easily revised.

I should like now to turn to the third stage in the systematic approach.

Evaluation

Since my paper is concerned with self-teaching and the development of the individual, the evaluation stage is an important one. How do you demonstrate that an individual has developed during his course? There is no clear answer to this and although one can apply practical tests of achievement to see if a student has acquired the skill, for example, of using the catalogue, what tests can you apply to demonstrate the development of an individual? The difficulty is of course one of definition in the first stage of the process. What are the desirable outcomes of a three-year immersion in a course of higher education? What does a student have to do to demonstrate his development.

Sir James Mountford saw this as development in three areas, that the student should be able to:

1. collect evidence for himself
2. form a balanced judgment about it
3. think for himself.[23]

It would however be difficult if not impossible to quantify these into testable objectives. People are not predictable units and consequently no simple process of defining objectives and testing to see if these have been achieved will suffice.

Evaluation of people and systems must take account of such complexity and since people and techniques are the theme of this conference I should like to end by giving you three very recent references in this field which will enable you to explore this area if you wish.

The first by Parlett and Hamilton describes a method which does take account of the complexity and is generally called 'Illuminative Evaluation'. The basis of this method is first to observe and become knowledgeable about the scheme that is being looked at, then to focus on particular areas and finally to look for general principles and patterns of operation.[24]

The second reference is an investigation of the field of evaluation specifically in terms of reader instruction[25] and the third, a valuable introduction to the whole subject of curriculum evaluation.[26]

Thus, in summary, I have ranged in this talk over the subject of the development of the individual in higher education, looked at a three-stage systematic approach to the development of course materials and have reviewed methods and techniques of instruction alternative to the traditional methods of lecture and tutorial. I have dealt particularly with the tape/slide method and have indicated how it should be considered for use not just on its own, as a passive method, but used with other techniques to allow active student involvement. I have indicated that although the three-stage process of definition of objectives, methods and techniques, and evaluation of outcomes will work in situations where outcomes can be accurately specified, this process cannot be applied to the complex interactions between staff and students in the development of the individual.

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The distribution of community information: the role of the computer and computer-based networks

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The concept of community information or social information is defined and related to other forms of information. The sources of information for residents of a specific community are determined. A 'computer assistant' (CACTIS) for a local community information centre is described. Different types of information networks are presented and related to regional characteristics. A networking study for community information centres, resource centres, and constituency offices in southwestern Ontario, with CACTIS as its focus, is described.

Introduction

AN INFORMATION COMMUNITY can be defined as a group of information users having common information needs. The common needs may be based on such attributes as geographical location, profession, education, employment, or special interests. Individuals may be members of several information communities sequentially or concurrently, depending on their needs.

Information needs can be divided into the following categories:

1. Social or pragmatic information needs—information required to cope with day-to-day life within a geographic community.
2. Recreational information needs—information satisfying the recreational and cultural interests of an individual.
3. Professional information needs—information required to operate competently within a business or professional environment.
4. Educational information needs—information required to satisfy academic requirements at an institution.

Community information centres, also known, in North America, as neighbourhood information centres or information and referral centres (similar to the Citizens' Advice Bureaux in Great Britain) arose, for the most part, during the 1960s, in response to an increased demand by citizens for *social* information. Although programmes to minister to the various economic, educational, medical, and recreational needs of citizens had increased at all governmental levels—federal, provincial or state and local—an individual with a specific problem might spend days, weeks, or even months finding the right office or contact person to approach. Access to services provided by business and

Aslib Proceedings, 28 (9), September 1976, p. 314–321. Printed in Great Britain

private organizations presented similar difficulties to the citizen, and the role of pathfinder here too was assumed by community information centres.

Information to the citizen has always been one of the functions of the public library, and in fact some community information centres did emerge from that institution. However, the needs satisfied by community information centres on the one hand and libraries on the other are essentially different. Community information centres are concerned primarily with social or pragmatic information, libraries with recreational, professional, and educational information.

The difference between these two institutions goes beyond the needs satisfied, however, to the mode of information transfer. Libraries are collection-oriented or secondary sources, i.e. they function by collecting information in the form of records—books, journals, films, phonograph records, etc. They do not generate their own data bank. The records are stored and the user is provided with some tools for retrieving the information contained within them, for example a card catalogue, an indexing or abstracting journal, a reference librarian.

Usually pragmatic information is not provided from a collection oriented source. Rather, it comes from the local newspaper, the telephone directory, radio hotline shows, and contact people in organizations and businesses. These might be called distribution-oriented sources of information. Because of the impermanent nature of pragmatic information, it cannot be provided from an information base consisting of publications and other permanent forms of record. The collection and organization of the information in their store is as important a part of the function of distribution-oriented sources as the actual retrieval of information from it.

Community information centres fall into the category of distribution-oriented sources of information. However, they can be regarded as more than a source of information. They provide an index to other distribution-oriented sources of pragmatic information within the community. They are secondary sources for the resources of the community rather than secondary sources for the resources of a library. Community information centres thus fulfil the important function of indexing and abstracting information sources within a community as well as collecting information as a primary source.

Specifically, the functions of a community information centre can be divided into the following:

1. To acquire community information from all available sources
2. To analyse this information
3. To organize this information
4. To link potential users to agencies and groups operational in the community
5. To serve as a feedback port for community services and resources.

Personal interaction is the key to a successful community information centre. To keep the database current, liaison must be maintained with a network of offices, services, individuals and resources throughout the community. To achieve their aim of providing pragmatic information to all clients, regardless of status or difficulty, the communication with the client is at a personal level, and includes counselling as well as informing. Very few questions are left unanswered; either the information is provided or a referral is made to another agency.

In such an environment, the value of computerization must be considered very carefully. If automation will detract from the client–staff interaction, then its value is dubious. On the other hand, if automation can free staff from onerous clerical duties, so that they can spend more time talking to clients and tracking down the information they need, then its introduction may provide real benefits.

Using a computer to carry out some of the functions at a community information centre can be justified if it results in improved service or economies of operation without deterioration of service. Funding and staffing are major problems for most community information centres. Few in North America have a guaranteed funding base; most, like the one studied by the authors, Information London in London, Ontario, Canada, exist from year to year on grants from a variety of sources, governmental and private. Staff are frequently voluntary or, at most, poorly paid, and the turnover rate is high. Most staff time must be devoted to handling client calls.

Many suggestions have been made for introducing computers into the retrieval operations of a community information centre. These usually propose the development of a computer database for querying either by the centre's personnel or, via terminals distributed throughout the community, by the clients themselves. In some proposals, user input to the database in the form of an 'electronic bulletin board' is also possible. Some have even seen such terminals as instruments for citizen feedback to government agencies.

CACTIS, the system developed by the authors, did not take this approach, for several reasons. On the question of user direct-access to the database, it was felt that this placed conflicting demands on the system. If users are to access and modify the database directly, the command language becomes all important. It must be simple to use, so that even poorly educated or non-English-speaking users can learn it quickly. On the other hand, it must be extremely expressive, so that all types of information needs can be input without other assistance. If a language satisfies one of these criteria, it is unlikely to satisfy the other. Another problem for this project was that Information London is not physically situated so that users call at the premises. Most queries are by telephone.

On the question of a staff-oriented on-line retrieval system, results of a previous study[1] had indicated that on-line retrieval provided no real advantage in a telephone-based question-answering service. Physically, it is more convenient to consult a manual index than to log into a computer system, input queries to a database, and wait for responses. It is no doubt possible to develop more sophisticated systems than the one used in the earlier study, systems which would be continuously available for access and which would show improved response time. However, the costs of such systems, given the limited budget at community information centres, seem to preclude their serious consideration. The on-line airline reservation system is an appealing model, but it must be remembered that information centres handle a much greater diversity of query types with a very small fraction of the budget of airline companies. In addition, interviews with personnel at Information London indicated low user acceptance of the retrieval system.

On the question of citizen feedback, approaches other than interactive terminals are probably equally effective, at a lower cost. While direct access gives the user a feeling of personal involvement, judicious filtering of query characteristics may be a more powerful factor in determining government policy. This whole area deserves rigorous investigation.

The purpose of CACTIS (Computer Assistant to a Community Telephone Information Service) is not to provide users with access to the database or with feedback facilities to the government. Its aim is more modest, although possibly more realistic: use the computer as an assistant to make as effective and efficient as possible the maintenance of the database and the dissemination of information from the system as it now exists, developed by Information London personnel in a form appropriate to their needs.

The day of the 'total systems' approach to computer applications is past. If a computer is to play a role in an information centre or any other environment where the users are not computer specialists and have no interest in becoming specialists, it must interface easily and transparently with these users. In developing CACTIS, the authors have attempted to provide such a system.

The CACTIS system

In order to provide telephone service to the community, Information London needs extensive and up-to-date files which can be searched easily and quickly. As with community information centres, Information London creates, to a large extent, its own database. This is accomplished through personal contacts, from releases, brochures, and other material distributed by organizations, and by a careful perusal of local newspapers.

The file organization developed by Information London staff over a period of five years is adequate to fulfil their purpose. The most heavily used information is kept on looseleaf pages contained in subject binders. Each binder provides information about a specific area, such as senior citizen facilities, daycare facilities, community organizations. The subject areas have developed as a reflection of need and usage. In addition to these binders, a general subject Kardex file and detailed information file-folder cabinet are maintained.

Although the organization of the information is adequate to meet the needs of the Information London staff, the maintenance of the files, prior to the development of CACTIS, was becoming more and more of a problem. The database required constant updating because of the nature of the information with which it deals: for example, what functions are provided by local human service agencies both governmental and private, who are contact persons, what social, recreational, and educational activities are going on? In the manual system, the staff made updates to the database by simply writing on the old records or inserting new records where they could. This method resulted in binders so cluttered with inserted records and changes that the effectiveness of searching for information when needed was significantly degraded.

In addition to their telephone assistance, Information London publishes an annual community directory for sale to other community groups. This project involves a sizeable investment of staff time in updating entries and retyping the entire directory. The cost of printing the directory has been recovered mostly by sales.

Thus it appeared that computerization could be justified if it could produce more readable binders for easier recovery of information, more effective update capability, and, in general, more effective use of staff time. In addition, an automated system should provide special lists not otherwise available for internal use and distribution to the public with minimal time expenditure of the staff. These special lists could be subsets of binders, rearrangements of records by alternative classification schemes or geographical area, or as results of keyword searching. By treating the community directory as a binder, it could be kept up to date on a continuous basis and used as a source of community information throughout the year. Once a year it could be produced as a special list and offset printed from the computer output. This procedure could reduce dramatically the time and money spent in its production.

The use of a computer to perform these functions was suggested by the earlier study mentioned above. In the spring of 1975, the Canada Department of Communications awarded the University of Western Ontario a research grant of $26,400 to implement these recommendations. The result of this grant was the development of the CACTIS system (Figure 1) by the University and Information Systems and Services, a local consulting firm.

The CACTIS system has three objectives:

1. Provide assistance to the staff of a community information center by automating certain functions of the manual systems for information control.
2. Provide additional facilities for information handling, and thus facilitate additional services to clients.
3. Incorporate the computer as a working tool of the information centre staff, so that they can handle it with ease and confidence and within their time constraints.

The system is a mix of interactive and batch mode operations. Data input, updates, and list requests are performed interactively on-line. Actual processing of these requests is done in batch mode, to take advantage of less expensive computer time and free the staff for other work. Access to the system is via a terminal located in the Information London office. The system resides on the Decsystem 10 computer at the University of Western Ontario. Interaction with the computer is limited to editing input, displaying input, and syntax checking. This procedure is not difficult for the user and response is rapid even when the computer is being heavily utilized.

When ready to process the requests, which may have been input at one or more input sessions, the user makes contact with the computer and issues a single command to initiate the processing of all requests stored on disk. The user is then free to go home or attend to other work. The processing in batch mode of these requests is deferred until it can utilize less expensive computer time. This deferment also ensures the availability of the private disk drive which holds the data base. When processing is completed, the results are stored on the common disk for access by the user. When the user is ready for the output, generally the next morning, he again makes contact with the computer from the Information London office terminal. He then issues a single statement which produces the output via the user's terminal in the format requested. The output

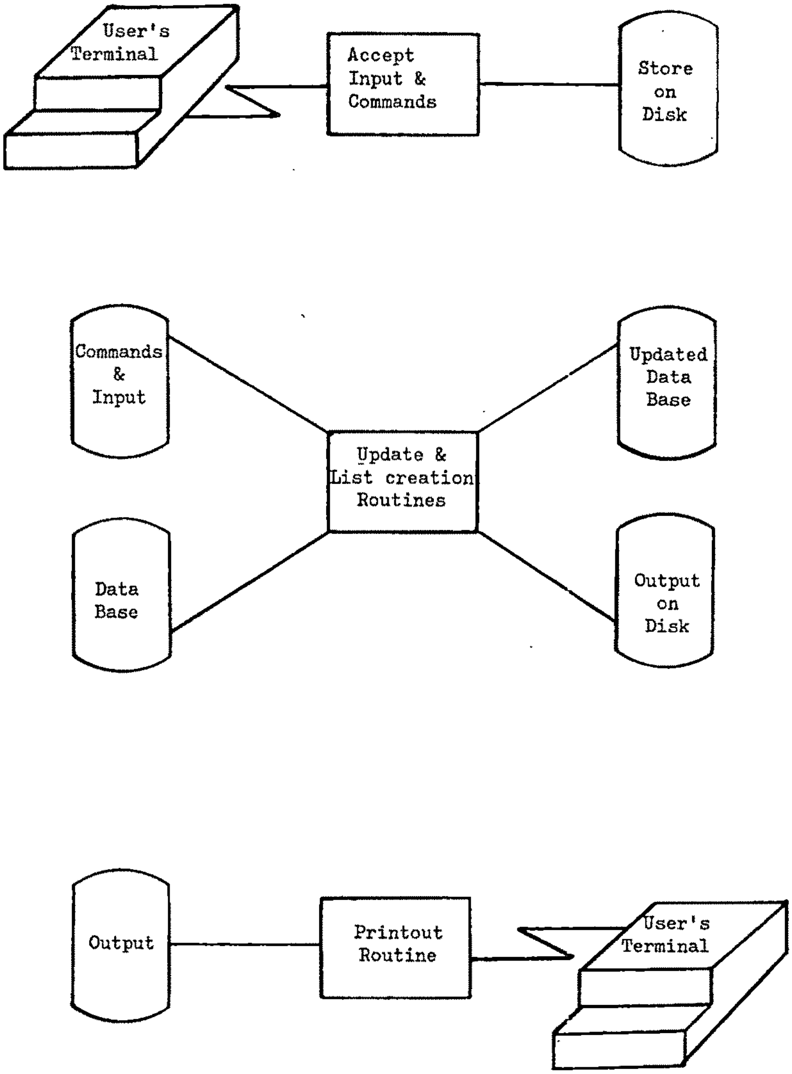

FIG. 1: *The CACTIS System*

procedure has a restart capability to allow for the production of extra copies of certain lists even though not originally requested.

The output from updates can then be entered directly into the subject binders, retaining the old pages for a history file. Special list outputs can be transformed into ditto masters for reproduction and distribution inside and outside the office.

Networking

Many of the same information needs occur in adjacent localities and some of these needs may be satisfied from common sources. When this happens, cost savings and improved service may result from shared databases and regional networking.

Penniman *et al.*[2] have distinguished the following networks:

1. Computer network—an interconnected set of dependent or independent computer systems which communicate with each other in order to share certain resources such as programs or data and/or for load sharing and reliability purposes.
2. Communication network—transmission lines, concentrators, switching mechanisms, and non-data-processing functional components of a telecommunication system.
3. Information network—a situation in which more than two participants are engaged in a common pattern of information exchange for some functional purpose.

Regional social information networks fall into this last category, but could be implemented in various combinations of computer networks, communication networks, and information networks. Among the possibilities are:

1. Exchange of information by telephone, telex or mail with each information centre accessing its own sources of information.
2. A central database of information of common ground which could be accessed by all of the information centres in the region. The central database would be maintained either by a single centre or jointly by some or all of the member centres.

An appropriate network variety may be determined after consideration of:

1. Population density of the region—for example, rural areas with scattered small centers of population have different requirements than rural areas with larger centers of population or than densely populated urban regions.
2. User group within the region—are the members of the information community being served individuals, organizations such as legal aid or consumer groups, or are the users parts of larger networks or larger organizations such as public libraries?
3. Communication and computer hardware needed—the cost and reliability of hardware must be considered.

In a densely populated urban region, community information centres may co-exist with special interest organizations. The information centres will have a database dealing with regional and local information and users restricted geographically. The special interest groups on the other hand will have a database dealing with a particular interest and users who are not restricted geographically, but by interest. In such an environment, the database may be segmented among the user nodes in a distributed type of network. This leads to problems related to standardization of database formats and to development and acceptance of a common query language.

Another approach in the same environment is to keep the entire database at one location. In this case the technical aspects can be dealt with by a single professional group. A central group could be responsible for maintaining the regional information while the special interest groups would be responsible for maintaining specialized sections of the database.

In a region containing a number of small and medium-sized communities, each with its own information centre, a single database at the largest centre, maintained jointly by all of the nodes, may be the most suitable network.

The authors are currently studying the feasibility and optimal form of a regional information network for this last type of area, specifically for that part of southwestern Ontario centred at the city of London. This study is being funded by the Ontario Ministry of Culture and Recreation and by the Canada Department of the Secretary of State.

The CACTIS system and database could form the nucleus for a regional information network encompassing smaller community information centres, other resource centers, and constituency offices in the area of southwestern Ontario served by London. In designing the network, consideration is being given to the following models:

1. Smaller centres access the CACTIS database in London via terminals, using the central database for updates and printing of lists and directories.
2. Smaller centres access CACTIS in London for on-line retrieval of information from the central database.
3. The database is extended to incorporate information local to the smaller centers. They can then access the database to retrieve information of regional or local interest and update local information for their files.
4. The database is accessed only at Information London.

Information is exchanged with the smaller centres by telephone, mail, or other existing communication channels.

If networking can bring benefits in cost and effectiveness at the regional level, then the same advantages should accrue at the national and international levels, although the difficulties in achieving a co-operative effort will be greater. As Kochen[3] has pointed out, information and referral centre networking may be the first step in the evolution of a world 'brain'.

In summary, networking eliminates duplication of information gathering and maintenance activities while at the same time allowing the development of local resources. Networking should also facilitate citizen to government feedback and information centre to government feedback.

The optimal form of an information network has yet to be determined. The authors believe that the development of regional information networks from the grass roots level upwards will be a first step in this direction.

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ABSTRACTING AND INDEXING SERVICING AS DATABASE PRODUCERS: ECONOMIC, TECHNOLOGICAL AND CO-OPERATIVE OPPORTUNITIES

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VOL. 28, NO. 10

Aslib Proceedings

VOLUME 28 OCTOBER 1976 NUMBER 10

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Abstracting and indexing services as data base producers: economic, technological and co-operative opportunities

Proceedings of a one-day conference arranged by Aslib in association with the British Library and the Department of Industry and held at the CEGB Conference Hall on 7 May 1976

Introduction

I THINK THIS conference is an extremely timely one and an extremely important one. I think that to a great extent the importance of the industrial information centres, for instance those belonging to research associations have not been considered as an important national asset. All the research associations over a period of many years have developed their information services, abstracting and communication services to such an extent that they are now important data sinks for their industrial segments. In fact research associations have developed, not only in the classical abstracts for the chemists and physicists, the traditional scientist, but also now for economics, marketing and industrial information of all sorts, health and safety regulations and EEC regulations. All this sort of data is now an important aspect of their information networks. There are 43 research associations in Great Britain and they have data sinks which, in my opinion, are underrated and underutilized except by their own membership, and I think the future of those bases should be a subject for considerable study, both by the British Government, the British Library and the other organizations concerned. I believe we have something unique here in this country which I would like to see collected together and exploited in the fullest sense. It must always be quite clear that unless we do take this sort of action we can see ourselves losing out to the very heavily subsidized organizations e.g. France and Germany.

The conference today, as I said before, is both timely and opportune and I am looking forward very much indeed to the papers presented.

A. R. PAYNE
Director, SATRA.

A&I services as database producers: economic technological and co-operative opportunities

D. H. Barlow

DIRECTOR, INSPEC

IN MY TALK today I plan to talk about the challenges and pressures that face us all and then try to depict some of the opportunities that lie before us in the economic, technological and co-operative areas.

But I must make one point clear before I start. There are few if any golden economic opportunities waiting to be seized and which will ensure those that seize them a lifetime of first-class cruises to the Caribbean or endless Concorde trips to Bahrain if that is your choice. In fact I would question the use of the word 'opportunity' when faced with today's economic problems. The abstracting and indexing services are rather trying to find a way to minimize the adverse economic effects that are occurring on their production operations and on their subscribers, all of which depress the market. So my talk will be more a review of the problems we face today—a discussion of the possible routes we can take to avoid difficulty—and a selection of some co-operative ventures that can offer some early returns.

UK A&I Services

First let's look at the UK's A&I services, particularly those supplying machine readable databases.

A study of the Aslib/EUSIDIC report 'Databases in Europe' expressed in Figures 1–3 shows the position.

Organizations with Databases	55
Machine readable Databases	74
A&I Services	99
Products	220

FIG. 1: *UK A&I services*

Agriculture	24
Biology	3
Chemistry	4
Earth/Space	6
Medicine	1
Physics	2
Civil Engineering	3
Electrical/Electronics	4
Mechanical Engineering	10

FIG. 2: *Databases*

Aslib Proceedings, 28 (10), October, 1976, p. 325–337. Printed in Great Britain

Metals	1
Nucleonics	–
Paper/Printing	4
Textiles	1
Transport	1
Business	1
Education	1
Patents	3
General Science	4

FIG. 3. *Databases*

Sources: (a) British Council report 'British Scientific Documentation Services'.
(b) Aslib/EUSIDIC Report 'Databases in Europe'.

The figures quoted for the 74 machine readable databases do not take into account organizations that only produce publications. Study of the British Council documents on the range of scientific documentation services gives details of 220 products from 99 organizations. These cover natural and life sciences, technology and engineering and include all types of product. This rough analysis indicates that only half of the UK documentation services are mechanized. This is only a very rough estimate made on the sparsest of evidence but is sufficiently valid to give an order of magnitude.

The problems we face

Whether mechanized or not all the UK A&I services face common problems of:

The pressures we face
Economical
Technological change
Literature growth
Market decline

What of the economic challenges

A&I services face pressure on two fronts, economic pressure on their customers and pressure on their production costs. As for the customers, it is generally accepted that the larger A&I services operating with more than, say, 26,000 items processed a year are charging around £30–£40 p.a. which puts the product outside the personal subscriber. The market is the libraries of large universities and research oriented companies.

All of these face the declining information pound. Today's A&I customers have declining budgets, increased cost of staff, increased acquisition and spiralling costs of primary and secondary publications. Libraries have to justify what they want to buy or keep. But all these trends are not completely adverse to the A&I services.

A study by the Indiana University Graduate Library school checked out the attitudes of 430 US libraries and 250 publishers. Though the figures are now over 2 years old, the trends they show are valid.

The clearest result of the study is that libraries have been struggling to maintain their journal subscriptions by cutting back substantially on their acquisition of books.

Although libraries have managed to maintain their journal acquisitions programmes surprisingly well, the budget crunch is clearly beginning to show. The increase in the number of subscriptions tailed off markedly in 1971-73 as compared to 1969–71 (6 per cent versus 10 per cent) while subscription cancellations grew. In large academic libraries, for example, the ratio of new subscriptions to cancellations dropped from 55:1 in 1969 to 7:1 in 1973. The cancellations appear primarily to affect duplicate subscriptions and secondarily non-US journals.

Library budget problems are severest among academic libraries and least severe among public libraries, with special libraries in between. The most important markets for technical journals are academic and special libraries.

Virtually all libraries participate in inter library loan programmes and many are now a part of consortia or networks. This increased 'availability' of periodical material through sharing and borrowing has caused 20 per cent of the reporting libraries to drop some subscriptions and 10 per cent to drop duplicate subscriptions. It has also increased the amount of loan traffic (largely by photocopying) by roughly a factor of 2 from 1969 to 1973.

The study also showed what happened to library budgets as libraries made a reorientation of their periodicals budgets by:

decreasing new subs
dropping duplicates especially of A&I services
dropping some single copies.

Table 1 shows, as a series of percentage changes, how the libraries met the problem of shrinking budgets. The trend is clear—reducing sales. So much for the market place.

	Academic libraries (per cent)			Public libraries (per cent)			Special libraries (per cent)	
	Small	Medium	Large	Small	Medium	Large	Small	Large
Fewer new subs	30.8	42	44	15	16	27	13	43
No new subs	34	11	4	25	8	8	16	8
Dropped duplicates	0	9	31	3	2.7	10	1.7	8.7
Dropped only sub	15	20	26	3	5.4	6.2	11.7	26.1

TABLE 1.

What about production costs?

The same story for the information field as in all other areas—costs in the UK UP, UP and still further UP. A&I Services are notoriously labour intensive and consequently have suffered in recent years when information scientists' salaries have risen from £1,800 to £3,000 in the last three years. Paper costs are up by 80 per cent in three years. Distribution has rocketed with postal charges reaching exorbitant rates. Just how these affect the A&I services can be seen from Chart 1: the cost breakdown percentages of a large A&I service as calculated in 1973.

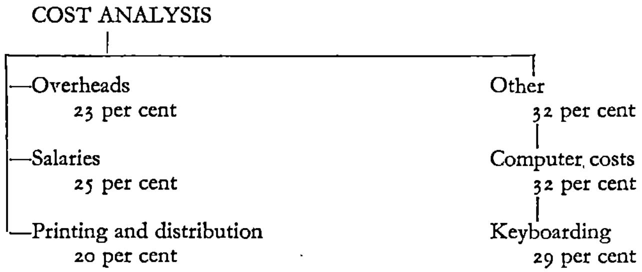


CHART 1.

Literature growth

So much for the economics facing us—what about the growth of literature? Any growth here means increased costs which the A&I services have to either absorb or pass on to the subscriber. The only alternative is to reduce coverage which then lays the service open to specialist competition coming in to cover just that bit of the market. So any measure of the growth we face is of prime importance.

There have been numerous figures ranging all over the place for the growth of literature in science and technology. Figures as high as 12 per cent p.a. have been quoted—but these were in the heyday of white hot technology and massive space programmes. Luckily for us the latest rates are well down on this—in the region of 3 per cent.

These figures come from a recent study done for the National Science Foundation in the US. The findings:

Resources being spent on STI communication have grown by 320 per cent from 1960 to 1974.

This growth is due to:

1. The increase in the numbers of scientists and engineers.
2. The unit cost of information services rising faster than inflation due to the rapid rise of scientists' salaries in 1973.

The number of scientists and engineers in the US rose by 3.8 per cent p.a. from 1960 to 1975 and the increase will level off to 2.7 per cent p.a. by 1980. This means that STI services and products will level off as there will be fewer producers and users.

Science and technological journals account for the major portion of STI communication expenses (63 per cent).

Of this total expenditure:

60–70 per cent goes on individuals writing, reviewing and reading papers.
25 per cent goes to libraries and secondary services.
10 per cent goes to publishers.

An ominous picture occurs in scientific book publishing:

1. The number of titles is up from 3,000 in 1960 to 14,000 in 1974.
2. Productivity per scientist has risen from one book per every 343 to one per every 137.
3. *But* the number of copies sold per book title has fallen by more than half in the same period.

In journal publishing, the number of journals has not increased dramatically (this may be surprising) but the report claims an excellent correlation between the US journal growth rate and the number of scientists—each at 2–3 per cent p.a.

Productivity of scholarly articles has declined from one per 10.4 scientists in 1960 to 1 per 12.8 in 1974. Most productive are life sciences, least productive are engineering.

A warning is given that academic libraries may have a decrease in the number of students to be served in the next five years. Interlibrary loans are up by 130 per cent between 1965 and 1974.

The number of abstracts processed by NFAIS increased by 145 per cent between 1960 and 1974 to 1.4 million items. This will increase by 20 per cent by 1980 to 1.92 million abstracts—an increase equivalent to approx 3 per cent p.a.

So this means we must gear ourselves for an increase of throughput of a minimum of 3 per cent per year.

Technological change

There are two types of change that will affect the A&I services. They are:

1. Changes in the delivery mechanisms
2. Changes in the mechanical/computer processing systems.

Dealing first with delivery mechanisms, what do we see? Obviously the word on everyone's lips is on-line. We have a new mechanism in on-line which will do all its proponents claim:

Immediate access.
Adaptive search techniques so as to give better results.
Low costs per search.

But one must get the technical claims into perspective as to the impact that on-line will or won't make. For instance:

A&I services serve a world market, particularly to developing countries. The printed word is still the main communication medium there.

Also remember that on-line searching can only go back till 1969 when databases started.

As you will hear, the European EURONET System is planning on starting with 700 terminals and expects to run at a rate of 300,000–500,000 searches per year. With a price rate of £10 per search this means the development of a market of £3–5 million locating information. One is tempted to ask—

is this new money available? Are the levels right? It is no secret that the INSPEC operation runs at a turnover of £1.5 m. Thus when one takes out of the £3–5 million new income from searches the portion in our own discipline, it means one is expecting an increase or a switch in revenue amounting to 60 per cent of one's existing business. The big unknowns are: which is it? how will it occur? and when?

Having said all this, I must say that I am an enthusiast for on-line but while I revel in its technological appeal there are many commercial and economic aspects that are not clear. But be that as it may, the signs in the US are that searches are growing:

in late 1972 the US searches were	270,000
1973 the US searches were	700,000

In Europe EUSIDIC figures indicate:

1972	Searches	9,700
1975	Searches	69,200

while the PA Management study commissioned as part of the EURONET exercise estimates 960,000 in 1980.

Viewdata

If this wasn't enough change to the traditional A&I delivery systems, consider too the PO Viewdata System. This has a built-in advantage over current on-line systems. There is a network to every location and it uses a mass-produced reception system—the domestic TV receiver.

Viewdata is the new interactive information service proposed by the Post Office and designed to serve the general public as well as the business community. It provides for on-line access to a database of useful information via an adapted domestic TV receiver and a telephone line. It is very simple to operate, using a numeric hand-held keypad to select information displayed on the screen. The main components of Viewdata are:

1. The Viewdata computer to supply the information.
2. Information from a variety of sources.
3. A public switched telephone connection.
4. A modified TV receiver with keypad to access the information required. The telephone connection could be configured as an extension on an existing telephone or as a separate exchange line. A full alphanumeric keypad may be introduced in the future.

1978 will see an open public service—so database suppliers have more negotiations ahead of them to see if their databases can be exploited.

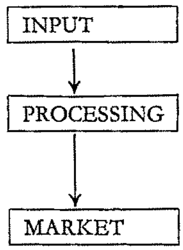
Summary of challenges

So much for the challenges that face us. I have covered:

the market place
literature growth
technological change

All these can be summed up in Chart 2.

THE CHALLENGES



LITERATURE
up by 3 per cent p.a.

COSTS UP DUE TO
(i) Literature increase (3 per cent)
(ii) Inflation (10 per cent?)

DECLINING MARKET DUE TO
(i) Smaller library budgets
(ii) Challenge of new technology

CHART 2.

But can we tell what the rate of progress will be? This is difficult as there are so many barriers. A review from the National Science Foundation in the US lists some of them as follows:

> *Inadequate financial bases.* On-line services are vastly underutilized in the US, partly because users and their organizations are unable or believe they are unable to pay the going rates. The situation is worse in most foreign countries and is likely to remain that way in virtually all scientifically developing countries for years to come. Still, use is growing, and there are harbingers of use in other countries as well.
> *Uncertainties on pricing and marketing strategies.* What pricing and marketing strategies offer the best assurance of long-term economic viability of services and networks? How can we best accommodate the copying preferences of users with publishers' requirements for economic solvency? These and related issues are sufficient to impede most new ventures today. Research and experience is the only way to provide answers.
> *Lack of familiarity of on-line searching and networking among users and purchasers.* In the US only a small fraction of potential users are reasonably sophisticated in use of current computer-based searching tools. The situation is worse in most foreign countries. The answer obviously is vigorous pursuit of education, user training, and marketing programmes and research to learn how to familiarize potential users with current searching tools.
> *Policy void.* The information policy void in the US is matched internationally. UNISIST offers some hope; additional guidelines might come from the experience of multinational programmes such as AGRIS and INIS or from bilateral projects such as work toward a common US/USSR format for the exchange of machine-readable bibliographic records. If past experience is a guide, this problem, however, may be resolved by a series of *de facto* acknowledgements of 'progress' based on operating arrangements worked out pragmatically by organizations that are committed to gain the benefits of networking. Meanwhile, of course, barriers now imposed by differential tariffs and national telecommunication policies will have to be resolved.

Opportunities

Having defined the problems, where can we go from here? Luckily there are many opportunities for A&I services to work together and to take advantage of new technical developments. Let me list some under the two headings—Technology and operational Co-operation.

Technology

Out of the vast choice facing an A&I systems designer and manager here are a few worth watching:

Word processing machines are a new and growing field which A&I services must cultivate. A review of producers of word/processing machines which can be considered a merger between mini computers, keyboards, disc memories and cassettes shows that in the UK there are 22 suppliers, all of whom anticipate good growth. This equipment wants watching as in reasonably unsophisticated ways cassette storage can be used for keyboarding and then linked via Varitype editing terminals where text corrections and typesetting commands are inserted prior to composition.

Editorial processing

A two-year study has been done in the US and is being reviewed in the UK context on the concept of an editorial processing centre.

The editorial processing centre is a computer facility that can be used by authors, editors, technical reviewers, and publishers, and that can be shared by a number of different user groups. Use of such a facility promises significant savings in the editing and publishing of professional journals—significant savings in both money and time.

The key elements of the concept are:

Capture of the manuscripts in a computer-readable form at the earliest possible stage, ideally from the author.
On-line computer-assisted text editing capability for journal editors.
Typesetting the page make-up directly from the edited magnetic tapes without the need for re-keyboarding by the typesetter.
Using keyboard terminals and communications technology obviates the need for any one user to maintain his own on-site computer.
Computer assistance in the editor's selection of reviewers.
Computer based manuscript tracking system.
Computer based business management aids.

Manuscripts would be received from authors, typed in a form readable by an optical character recognition (OCR) device which would later be used to scan the typed page and record the information on magnetic tape for subsequent computer processing.

The editor's reviewer selection would be aided by using computer produced directories of reviewers, whose names would be furnished by the editor for each journal or for each group of journals. Mailing labels and reviewer comment forms could then be generated by the computer. A record of when each manuscript was sent to a reviewer would be made at this time and the system could then generate a 'tickler' letter to reviewers who were late.

After all revisions were final, the revised manuscript in OCR readable form would be entered into the computer database. Redaction, or copy editing, would be performed using video display terminals, and all necessary control codes for subsequent computer phototypesetting would be inserted at this time at the editorial processing centre.

Page proofs would then be generated by the phototypesetter from the clean tape prepared by the editorial processing centre. These would be sent to the author or journal editor (or both) for review. Last minute alterations would be made by the editorial processing centre to the master text stored in the computer and final camera ready copy would be produced and sent to the printer for printing and distribution

During the entire process, a computer-based manuscript tracking system would monitor the progress of the manuscript through the various steps, creating 'tickler' notices as necessary. At the completion of the entire process, a clean magnetic tape of all the articles printed in the given issue of the journal would be available for abstracting, indexing or other secondary uses.

A pilot experiment in EPC is being financed by NSF in the life sciences field.

Economic models

One new area from which A&I services can gain advantage is by generating models of their own business. In work that has been done in the setting up of the UK on-line consortium by the British Library, Department of Industry, Chemical Society and the Institution of Electrical Engineers, a complex economic model of the whole business operation has been generated in an on-line mode. The standard programme packages have been used from an on-line service bureau which enables a model of business to be constructed in approximately two days and once constructed the advantages are enormous. One is able to add to and alter the model very simply and can include different configurations to generate the capital requirements, interest payable and more importantly can operate the model by altering the data on-line and generating the results of new conditions.

For instance, in the model under test the number of searches projected over a five-year period were altered at will from the terminal and the model then calculates the rate of return on the capital employed in the whole business. Similarly a whole series of variables can be adjusted and projections made for the future of the business.

Within INSPEC this method has been used for sales statistics generation so that we know exactly the sales situation occurring in the various countries. This is being extended for budgeting purposes which will allow alteration of the rates of overheads, agents commissions, dollar conversion etc.

This is a method which A&I services would be well advised to investigate since it allows one to examine the effect of different parameters immediately with minimal work.

Synopsis journals

Is this another technical area which A&I services have to watch? Certainly, if one listens to the exponents of the synopsis journal.

For those that want to keep up with this technique, the West German Chemical Engineering Technique carries author-synopsized articles of one page while the full manuscript is microfilmed. Subscriptions include the synopsis journal with its own subject index and full text on microfilm or microfiche as well as the right to publish as often as needed. Publication time, it is claimed, has been shortened from 9 to 12 months in the conventional form to less than 3 months in the new synopsis structure.

The UK Chemical Society is planning to follow this example. The Society estimates that their journals should cost about 25 per cent less than a conventional journal including the micro readers. Another version in the Chemical Society project is a mini-print publication in which the microfiche negative (which has to be made anyway) is used to blow up images to approximately one third the size of the original typescripts. Mini-print of acceptable quality can be produced in this way from typescripts prepared using a standard electric typewriter (provided the keys are clean and good black ribbon is used). This is obviously another area which A&I services which will have to judge for themselves as to the effect on their own operations.

Closely linked to this is the question of demand publishing. This area has been tackled by the IEEE in the US which is running a large scale experiment called Annals. Technically the system is a modified selective dissemination service, but functions as a journal. It is based on the contents of the IEEE's thirty-six technical periodicals. The subscriber can pick and order either in advance or after publication from the original publications just those papers of direct interest to him. These are produced as full size reprints of the complete papers. This system is still in its experimental form and it will be interesting to see how it actually operates.

Co-operation

So much for the technical areas which offer new challenges and new approaches. I think now co-operation needs examination.

In general, the amount of co-operation that can be built between various organizations depends on the drive and enthusiasm injected by the top executives of the organizations concerned. But however much drive there may be, there are many technical problems which have to be overcome: the first of these is to ensure an adequate exchange of classification mechanism that will provide a framework for co-operative interchange between two abstract and indexing services. This is difficult if the areas covered by the A&I services do not completely overlapped but are slightly askew.

Within its discipline area INSPEC is fortunate that in the International Council of Scientific Unions Abstracting Board there is a working group in physics. Here special efforts have been made since 1968 to generate a general classification system acceptable to the various abstracting and indexing services. This work is now achieving its first success which will simplify the interchange of material between the various organizations.

In 1968 a review of various classification systems used by the French, German, Russian and English abstracting services was made. There was a remarkable degree of commonality in the structure of the classification systems, and an effort was made by the four organizations to arrive at a common classification for the physics field. This was agreed in May and in 1977 a common classification covering the main areas of physics and also the interdisciplinary areas of geophysics, astronomy and astrophysics will be used internationally.

Other problems that can occur in trying to achieve co-operation include:

System compatibility, product compatibility, and financial arrangements

On system compatibility the first lesson to be learnt is that while the interchange of magnetic tapes is theoretically possible, advantages can only be realized if the tapes can be fed directly into each other's database. This means that one has to use identical classification and indexing terms, subject headings and one has to introduce all the problems of long-range control of indexing, abstracting and classification. Furthermore if the co-operation is going to be between an abstracting and indexing service and a primary publisher another problem arises as the indexing and classification is not being done solely for a secondary service but done by the primary publisher with a view to his audience. This can well cause a shift in emphasis on the indexing approach.

On the question of product compatibility, it is very clear that unless there is a will to agree a clear understanding of the roles of the different products and services produced by the two organizations, co-operation will be difficult. There must be for instance no question of duplication by one organization of products already in operation by the others. The point must be watched that any co-operation be objective, the product strategy the same, and that there is no overlap or conflict between the products in the market place.

Finally on the financial side there has to be a compatibility of objectives. The concept of equal benefits for both parties has to be rigorously preserved in the negotiations and there must be a financial incentive, albeit long term, which makes both parties feel that the extra work and difficulties in setting up such a co-operation will be worth while.

One other word of warning in negotiating arrangements is that while the general concepts are clear, negotiations will be lengthy, time consuming and difficult; and the optimum approach is through a series of minute pragmatic tasks with clear objectives.

Input exchange—A fruitful area

Looking at some of the co-operative areas, input exchange stands out. One example is a scheme proposed for an input exchange very much on the lines of the OCLC System. In this three abstract services, INSPEC, Physikalische Berichte in Germany and Bulletin Signaletique in France are planning to investigate the feasibility of setting up an on-line input exchange system. In such a system, as soon as material is received by any organization it is indexed in the normal way in their production operation. At the same time the material is placed on a common on-line file which is accessible with certain safeguards by the other two participants. When the other participants receive their copy of that journal and before starting to abstract it they interrogate the common file to see if this has already been abstracted. If so, under the co-operation arrangement they will then extract it from the common file and work on it on their on-line terminal adding their own language abstract and other data. After this it will be ready for feeding into their own production system. Saving estimates show that when the system is operative, it should save approximately 20 per cent of the abstracting cost.

Overlap studies

Another area of co-operation is that of overlap studies between various A&I services. How many services are actually covering the same journals, albeit from a different viewpoint? Here work is going on in the US through the National Federation of Abstracting and Indexing Services and through the ICSU-AB to try to generate an aggregate list of journals covered which will permit an analysis of the overlap between the various services. In the States experiments in fourteen organizations including INSPEC are feeding in the details of the journals they cover into a master list which has now reached something in the order of 22,000 titles. This list is being analysed to see the number of services which are covering the same journals. The second stage will be to assess the productivity of these journals and to see exactly how many of the same articles within these journals are being abstracted by the services. Here again the aim is to try and see if some co-operative venture can be launched to prevent services duplicating the abstracting of material.

On-line consortium

Finally the ultimate in co-operation is the proposed setting up of a UK on-line access service. As you will be hearing from other speakers the European network will offer great opportunities for the UK. The opportunity now offers itself by which the UK can take advantage of the EURONET transmission network to mount its own databases and to offer a service not only within the UK but also as an exporter of information to EURONET. There are many databases within the UK which are of specialist engineering appeal. We have available in large scale database areas, Chemical Abstracts through UKCIS, the INSPEC Science Abstracts Databases and in the agricultural field the Commonwealth Agricultural Bureaux. But equally important are the numerous specialist databases many of which are represented here today. These databases cover welding, rubber, plastics, geosciences, life sciences, and many other fields. These databases if all mounted together on the UK on-line service will then provide a real integrated engineering database and this is obviously an area where co-operation can be paramount.

The aims of the participants of the proposed consortium are:

(a) To ensure that the UK is in a position to contribute to the development of international information retrieval networks particularly in the context of the EEC's EURONET System.

(b) To stimulate the development of UK technological solutions to the problems of information handling.

(c) To ensure that information users in the UK government and academic and industrial areas enjoy the same level of access to information resources as is available in other technologically developed countries.

The object of the company is to establish a UK national on-line information centre capable of operating on a self supporting basis. In its initial stages the company will act as a UK marketing and support agency for selected on-line services available for non-UK sources, and then establish at the earliest possible date its own hardware and software capability to provide access to bibliographic and non-bibliographic databanks and to offer these services and to operate as the UK node to EURONET.

Final summary

In this brief review of the economic and technical problems that face us, we can sum them up as follows.

Economically we have problems of inflation. On top of that there is a 5 per cent per year growth in costs which has to be absorbed. We have a declining market and a different buying pattern in our library customers.

The only way that this can be overcome is by seeking new markets, by trying to penetrate further into markets that we have not tapped, for example in the Middle East, in the developing countries. Here we can operate by having some joint marketing operation between the abstracting services. This is something that could appeal to all of us to rationalize our marketing operation. For example in the US why not set up a unified marketing operation covering all British A&I services which could reduce our individual costs?

On the technical side there are a number of opportunities in introducing new techniques such as word processing and economic models. But a more co-operative process may be through editorial processing centres where organizations which have got computer typesetting facilities and file maintenance operations could set up a co-operative editorial processing centre. This is something the A&I services in the UK talk about.

There is also the on-line aspect where the new consortium can make Britain's services known in the EURONET system. Other areas of co-operation are in the infrastructure where the A&I services could work to review their classification structures so that exchange is easier.

Can we work together on the question of co-operative interchange of abstracts similar to the project that is being developed by INSPEC with Physikalische Berichte and Bulletin Signaletique? Is there scope for working on the study of overlaps? How much are we overlapping with each other?

All these are areas where we can work together, but one point that may delay us is that we do not have any co-operative structure through which these ideas can be discussed by the A&I services. In the US there is the National Federation of Abstracting and Indexing Services, and there are the services representing the information users. But in the United Kingdom there is no formal A&I organization. There is an information market place luncheon occurring every two months, but the co-operation levels being proposed here need more than that. It needs a formal co-operative effort and more formal organization.

Let me leave this with you as my final thought for co-operation.

EURONET

J. C. Gray

British Library, Research and Development Department

IN A SENSE this is one of a series of talks, starting with that which Cyril Giles and I gave back in 1975 and likely to continue as EURONET develops and there is new information to disseminate.

EURONET is the name given to a network of information services which is being developed by the European Economic Community. It dates back to June 1971, when the Council of Ministers resolved to create it and to form a Committee on Information and Documentation in Science and Technology (CIDST) to assist the Commission in the preparation and execution of plans. CIDST was set up in the following year and formed a number of general groups to deal with technical, economic, legal and educational aspects of the network, and also sectoral groups to examine information needs and resources and the scope for European cooperation in the subject fields of agriculture, bio-medicine, energy, environmental protection, industry and patents.

By March 1975, ministers were able to approve a three-year Action Plan (1975–77) authorizing expenditure on the creation of the network. Though a proportion of the money has gone into sectoral and infrastructural activities, the largest share has been devoted to the creation of the physical framework for EURONET. This is being done by a consortium of the nine telecommunications authorities under the contract placed in December 1975 and worth over £1 million. The framework will be based on packet-switching technology, a development of the software originally prepared for the European Informatics Network. It will link switching nodes in Frankfurt, London, Paris and Rome and remote concentrators in Amsterdam, Brussels, Copenhagen and Dublin. The planned starting date is the end of 1977 though it may well slip into 1978. Both the Community and the telecommunications authorities envisage that EURONET will open the door to an all-purpose public service network for Europe in the early 1980s.

Several important principles are emerging concerning the supply of information services through EURONET. For example:

1. The network should be 'open' and 'distributed', *i.e.* it should be open to any database and to a variety of service suppliers with their own choice of databases to handle and with their 'host computers' scattered through member states. Economics and convenience may eventually limit the range of service suppliers, but the qualifications for entry should be confined to acceptance of a few simple entrance rules, for example on providing equal access on equal conditions to all users in the Community.
2. Multilingual operation should be stimulated, though no restrictions will be placed on the entry of monolingual services. However, present multilingual systems are either costly or limited in effectiveness and their future scope is still subject to serious enquiry.

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3. Communications charges should be equalized, irrespective of distance, so that the more remotely placed users and service suppliers are not penalized.
4. Service charges should be related to costs and protective and competitive subsidies should be avoided. This aim will be extremely difficult to achieve since 'build-up' subsidies are clearly necessary in initial stages of supply and many suppliers will offer packages of information at 'all in' prices. CIDST is giving the problem close scrutiny.

There are several important implications of EURONET for UK database producers. Most important is the need for an early expression of interest in supplying databases to the network through some service supplier. This is because the telecommunications consortium cannot design the framework of nodes concentrators and links until it knows what kinds of host computers have to be provided for, when they will be ready, and how much traffic they are likely to generate. The Commission has asked for all 'offers' of host computers to be in by July, and a first, provisional set of offers will be examined by CIDST in May of this year.

The UK offer is a modest but realistic one, and involves four possible service suppliers.

1. The British Library which, pending the development of its MERLIN system, is creating a short-term facility to handle UK and US MARC and MEDLARS and possibly other British Library databases.
2. A proposed consortium of the British Library, the Chemical Society, the Department of Industry and the Institution of Electrical Engineers which will handle initially CAS and INSPEC databases, but later others.
3. The National Computing Centre with its databases covering computer hardware, software and literature.
4. The Computer Aided Design Centre, with a domestic network of centres in engineering design.

France and Germany are known to be contemplating larger offers than this, but the contribution of the smaller countries is not yet known. There will obviously be a strong emphasis initially on the large well-established data bases. However, there is considerable interest in the smaller ones, though the extent of the market for them is not known.

Normally a database producer has not sufficient resources to establish an on-line computer facility itself and to connect it to EURONET. This being so it has four alternative ways of gaining entry.

1. Attachment to a major national on-line facility, as and when created.
2. Formation of a domestic co-operative by database producers, *e.g.* those at present using the ASSASSIN system.
3. Formation of a bi-national or multi-national co-operative with other organizations in the Community.
4. Having the database run by a non-British organization, *e.g.* a national organization, the European Space Agency or possibly by one of the service suppliers in the Scandinavian network, SCANNET, if and when it is connected to EURONET.

Database producers need to consider carefully the technical, economic and operational implications of each choice. This is a complex task, but the British Library may possibly help with some aspects of it since a good deal of useful background information has been collected in studies which it has supported. It is desirable, however, to have an early indication of any firm desire to pursue one of the alternatives. The UK delegates to CIDST can then alert both the Commission and fellow members of CIDST to the existence of an interest and can take part in a fruitful interchange of ideas between themselves, the database producers and the service suppliers.

Any database producer interested in on-line operation will want to consider, alongside EURONET, the advantages of being linked to the rapidly growing North American networks through one of the established service suppliers in the USA. Several UK-based organizations are known to be pursuing this possibility already.

Present and future pressures on service operators

John Martyn

Aslib Research and Development Department

WHEN I WAS younger, I was never patient with my elders when they would talk about the 'good old days' and tell me how much better things were when they were themselves young. Recently, though, I have found myself occasionally being nostalgic about the past; like the first grey hair, this is a disturbing symptom, and I have been trying to pin down what I am really thinking when I say something like, 'Things were easier ten or twenty years ago'. I would personally sooner be alive now than at any other time—I don't share Gibbon's preference for the age of Diocletian, or the more common nostalgia for the recent days when most of the map was coloured red—and what I think lies at the bottom of any regrets for our dear departed past is a feeling that decision-making, policy formulation and any similar activity involving making guesses about the future is a more difficult exercise now that it used to be. One reason for this is obviously that things can change more rapidly nowadays—oil costs increase overnight, the pound can dive downwards, governments totter—which is to some extent a function of the increased ease and rapidity of communication, reactions to events in the world being speeded up by telecommunications. Another reason is that we now have very much more information available to us which is of possible relevance to our decision making. These factors influence us to some extent whether we are taking purely personal and domestic decisions, like deciding where to spend the holidays or what to do with our savings, if any, or whether we are deciding how to run our own, or our employer's or the country's business. Two of the factors which are increasingly influencing the operations of secondary service producers are the advent of more rapid and diverse forms of communication, and the constant growth in the volume of information. Why I have been saying this is to show that most of the pressures which affect or will affect secondary services are not specific to those services, but are more general, in that they are pressures which to some extent affect all the parts of the information world and indeed the whole of our present society.

The factors which are likely to force changes on us are economic, social and political. Economic factors include such things as the rising cost and eventually the scarcity of raw materials, changes in the cost of labour distribution costs and the availability of purchasing power in the market. Political factors, as we have heard this morning, include the organization of international agencies such as EURONET, the activities of bodies such as UNISIST, and possibly a greater concern on the international level in the organization and coordination of information resources. Social factors, the most diffuse but possibly the most

Aslib Proceedings, 28 (10), October, 1976, p. 341–346. Printed in Great Britain

potent collection of influences, include the emergence of new technologies for production and distribution of services, reactions of the consumer to these technologies, possible changes in the ways in which scientists and technologists acquire, use and present information, the possible emergence of new forms of information compilation, and the continually increasing and diversifying volume of information requiring processing.

Economic pressures

To illustrate some of the economic problems, I am drawing on a recent report by J. W. Senders on scientific publications systems. In this report (which, incidentally, is more about primary publication), it is noted that the price of paper increased linearly from 1940 to 1970, followed by a very rapid escalation in price, up to the present. Shifts in price are influenced by the requirements for new machinery made necessary by environmental legislation, by variations in the cost of energy and by variations in demand. The Food and Agriculture Organization of the United Nations has recently predicted a deficit of production over demand for the developed countries of 8.7 million metric tons in 1978, compared with a 1974 surplus of 2.6 million metric tons; the whole world forecast for 1978 is a deficit of 12.7 million metric tons. Bearing in mind these and other factors, Senders predicts that the cost of paper will either double or treble by 1980. This means that an organization publishing scientific material will find its paper cost increasing by even more, because not only does the price of the commodity increase, but also increases in the amount of material to be published entail the use of increased amounts of paper.

On labour costs, Senders indicates the difficulty of forecasting changes, this being dependent on such things as the success of governments in controlling domestic inflation. He notes, however, that as there is a trend towards wage equalization, which means that the cost of lower-paid labour is increasing more rapidly than the income of middle-paid workers, the labour costs for journals (around 55 per cent of the cost of primary journal production) are rising faster than the amount of money available for subscriptions. Postal costs are also affected by the results of policy decision, and the present trend of US postal charges suggests that they will effectively almost double over the next ten years, although this must be regarded as a somewhat optimistic forecast.

Aslib R & D Department, in conjunction with the Universities of Leicester and Sheffield, has recently been engaged in an examination of trends in scholarly publishing, our part of the activity being principally directed towards the reactions of librarians and information department administrators to the possible introduction of a number of alternatives to existing forms of publication, such as synopsis journals, publication on fiche, and so on. As a part of this exercise, we asked a number of questions about trends in existing library budgets and their allocation. The forty-six librarians we interviewed were chosen in order to give a reasonably good picture of the current scene, in terms of size and type of organization, but were not a random nor necessarily a truly representative sample, and therefore our results should not be used for extrapolation in other than a general way, but we are reasonably confident that they give a not-too-distorted picture of the way things are going. It looks as though library budgets are in general under some pressure, but at present the pressure is not acute, and in most cases budgets for the current year have been increased, although in a number of cases the increases have not kept pace with inflation. The primary journals market appears to be reasonably firm, although it is possible that there may be cuts in subscription in the future. In times of budgetary constraint, as might be expected, primary journals are more likely to be dropped than the secondary services. Over the past two years, seven respondents had increased purchase of secondary services, five had decreased (of whom three had dropped duplicate services or high cost/low-use services), thirty two reported no change, and two had changed to the use of on-line services. This is a fairly encouraging picture for secondary service producers, in that it looks as though the market is reasonably firm, but it is certainly fair to say that substantial increases in the cost of services will lead at least to more strict appraisal of the necessity of a particular service to a particular library, and if present economic trends continue for a number of years, sales will in the long term suffer.

Socio-technical pressures

So far as socio-technical changes are concerned, perhaps the most striking development of recent years is the advent of on-line access to machine-readable secondary services, held on a computer or computers often located in a different country and interrogated through a local terminal linked with the computer by the normal telecommunications facilities. This method of use differs markedly from conventional use of secondary services, because once the cost of the terminal equipment is covered, costs are generated on a search-by-search basis, users paying for the use of the telephone facility during the search, and a charge for using the service which is directly related to the amount of use. This is a complete change from the normal situation in which services are bought in at full cost and the amount of use (or non-use, sometimes) thereafter is not bounded by further cost considerations other than those of user time expended. For the first time costs can be directly related to use, opening the way to clearer assessments of value-for-money and, perhaps more importantly in the long term, making explicit to the user some of the real cost of information service provision. Other features of on-line search are the ability to change from one base to another and to have a reasonably large number of bases available for search without having to buy them, and the ability to perform more complex searches, relating several indexing terms in a Boolean structure, than are easily practicable with printed versions. There is also an advantage in being able to supply the user with a complete record of his search and a printed list of references as the result, without the necessity of a transcribing stage. The advent of on-line service is in fact quite likely to stimulate take-up of the more conventional means of information acquisition, both secondary and primary by making hitherto informationally unaware members of the potential market realize the existence of large information stores.

It seems unlikely that on-line access will totally supersede the use of the present conventional forms of secondary service provision, but it is certainly on the cards that on-line services will take over a substantial part of the present market for printed versions, as well as finding some of their market from among those who at present do not use secondary services to any great extent. The British Library recently conducted an exercise in which a number of user populations, principally in universities, were allowed access to a range of on-line services offered by SDC and Lockheed. About 1,200 searches were performed during this exercise, by a total of 586 searches taking on average between 14 and 23 minutes a search, and each search resulting in something like sixty references. Around 80 per cent of the searches were considered by the users to be partially or completely successful, most searchers felt they would continue to use the services and were willing to pay a pound a minute for use, and it is interesting to note that of the users who requested searches, 10 per cent claimed that they were not in the habit of using secondary services at all as part of their normal information-gathering behaviour. Among criticisms of the available bases, which are of course closely similar to the printed versions, the great majority (around 80 per cent) of users expressed a wish for increased coverage of non-journal material

Much of the impetus for on-line service provision has come from the availability of secondary services in machine-readable form, which in turn has been a result of the production of services by computer typesetting methods. Up to the present, the tapes have come into existence as a by-product of the process of producing the conventional printed versions, and the sales of the printed versions have provided the economic justification for the tape production. It is not too much a stretch of the imagination to visualize a future in which the tapes are the primary product of a service, with the printed versions as the by-product. This in turn rapidly increases the unit cost of production of paper copies. The provision of tapes, that is to say, may well become an economic necessity, and the service which cannot be accessed through one or other of the networks may find that its use, and consequently its market, will over time decline.

Primary journals are finding themselves in a more vulnerable position than secondary services, from an economic point of view, and although the effects of changes in primary journal production on the secondary services are very difficult to predict, it is safe to say that possible changes are bound to react on the secondaries in some way. What many people fear is happening to the primary journals is that they are faced with continually rising costs of production and distribution and with static or declining markets, and that they must consequently find cheaper means of production, diversify their products in order to reach fresh markets, or gradually go out of existence. A number of solutions have been proposed, including publication of synopses only with full text available on demand, on-demand micro publication, publication in typescript, co-operative use of a computer facility for editing and printing groups of journals (better known as the Editorial Processing Centre concept), or, the most technologically advanced proposal, the operation of an electronic journal. This last concept, which is most fully described in the report by Senders to which I referred earlier, envisages authors making use of an on-line facility for the preparation of their manuscripts, and submission of the completed work to an editor within the same facility, culminating in 'publication' of a paper by making it available on-line to any interested person who may wish to call it up and read it on the visual display unit of his own terminal. In this system, a paper would only be printed if a reader wished to have the text printed out off-line for any reason, and the physical form of a journal would be a reel of magnetic tape held at some remote computer location. Associated with the system would naturally be means for notification of the existence and nature of stored items, which would mean that the primary and the secondary publication were effectively united. Clearly, the successful implementation of such a concept would require very great changes in the habits of authors, and in the reading and use habits of the consumer population, but such a system would be technically feasible now, and it should not be dismissed out of hand as being too fantastic to be true. I mention it here as an instance of the extent to which the means of scientific communication may change in the relatively near future.

All the alternatives to conventional publication which are becoming available to primary journal producers, raise problems for the secondary services. In some cases, it might become possible for secondary services to collect references in machine-readable form from the primary producers, and incorporate them without much additional effort into their own systems. In other instances it may be necessary to make considerable changes in the means of acquiring references in order to include them in secondary systems. In some possible future, even the bibliographic reference itself may be more elusive than it now is. Whatever changes there may be, secondary systems will have to change in order to accommodate them.

Other possible changes which might be classed as 'social' concern the performance of secondary services as perceived by users. I have already suggested that future use patterns might promote a greater consciousness of the cost of use, which may lead to more direct awareness of the cost-effectiveness of services both as compared with each other and compared with desired performance criteria. This might lead to more demand for coverage in areas which are at present not always well covered, such as report material, government publications of one sort or another, theses, standards, patents and so on. This may in turn lead to the development of methodologies for assessing the performance in user-perceived terms of the secondaries. It begins to seem that what the user is likely to want is improved coverage, faster response time, easier access to data elements contained in references, access by technique or application, and access to areas presently not covered well, such as technico-commercial data, and economic information which is of its nature ephemeral. The standard criteria of recall and precision obtainable through the indexing languages are apparently becoming increasingly of academic interest.

Political pressures

The political pressures on secondary service producers have already been discussed at this meeting, and consequently I do not need to take them further now. I would merely like to add that the supply of information services is an invisible asset—perhaps semi-visible might be better—and it is clearly in the national interest that we should be so far as possible net exporters of information service. We can only do this by ensuring that our products can be accessed as easily outside the United Kingdom as they are inside; I have not mentioned

What the large users expect from secondary services producers

A. R. Haygarth Jackson

ICI Pharmaceuticals Division

IF YOU WERE a scholar at Merton College, Oxford, in mediaeval times, then for your BA degree you read the books down one side of the College Library and for your MA, the books on the other side. This was no mean task but those who accomplished it, had read virtually all the books that mattered. How different from today! The scholars of today suffer from the frustration described by the cliché 'information explosion'. Both the providers of secondary services and information units work to cure this frustration. However, from the morass, some messages can be distilled.

1. Individuals can no longer read, let alone remember, all potentially relevant publications.
2. On economic grounds alone, neither the individuals nor their organizations can collect, record and store for later retrieval, the literature judged to be of possible future interest.
3. Traditional methods for recording and identifying information have been found wanting.

Industry has started to interpret these messages and in-house information service operations are changing. For years industrial organizations have compiled alerting bulletins with items of interest culled from the current literature. The items in these bulletins are frequently indexed and stored for future reference. This type of do-it-yourself operation is expensive and hard to sustain in the present economic climate. Furthermore, although these in-house services have been tailored to the needs of today, they cannot always anticipate the requirements of tomorrow. So the trend within large industrial information units is a change in emphasis from a do-it-yourself operation to a buy-it-in policy. If the buy-it-in policy is to meet the end user's specialized needs, then the purchased product must be amenable to further manipulation, such as the creation of sub-files or the selection of raw data for local interpretation.

Another important development in industry is the recognition of 'information' as a valuable, tangible resource by higher management. This is leading to greater capitalization of information by encouraging all staff to make more effective use of it. There is also an increase in capital spending in pursuit of better usage. The industrial user will acquire the equipment and expertise needed to make efficient and effective use of electronic alternatives to paper-based communications. In particular, the user will make greater use of on-line, interactive terminals probably augmented by mini-computers controlled by information units. The user will want efficient and quick document delivery systems

Aslib Proceedings, 28 (10), October, 1976, p. 347–353. Printed in Great Britain

to back-up current awareness and retrospective search services. At present there is no preferred system but telefacsimile and microform and computer storage devices are improving and offer a possible solution. The purpose of this paper is not to dwell on technological developments, but the secondary service producers should be aware that the large industrial user will not impede, but will encourage the use of new and improved techniques.

As we move towards the 1980s let us consider some of the features that large users, especially industrial users, will expect from the producers of secondary services.

Co-operation and co-ordination

First and foremost, if progress is to be made and new techniques are to be adopted, then all parties in the information industry (including publishers of the primary literature, indexing and abstracting services, the information networks and the tertiary or review services), and the users must work together in a co-operative venture, to solve problems and develop services that meet the needs of users. Over the last few years joint consultation, both formal and informal, between secondary services and large users has increased. Although there is greater understanding of each other's problems, all too often at the end of the day the user feels that he has failed to influence the secondary service.

It would help large users if the commercially available information services would share with them their thinking and long-term plans. For example, the future of conventional primary and secondary publication is of considerable concern. Does the large industrial user continue to develop conventional libraries and find space to house these publications or does he invest in an extensively electronified system? Does he have a choice? A further point is that it takes time to train and recruit suitable staff with the potential to operate new systems and services and the large user needs as much advance warning as possible in order to implement changes in his staffing policy.

In addition, co-operation between database suppliers is required. The overlap between different services (for example, chemical engineering in 'Chemical Abstracts' and 'Compendex') is tiresome to the end user. The large industrial user considers overlap a waste of intellectual effort and to make it worse, he has to pay for this wasted effort.

Marketing strategy

The marketing strategies of the different suppliers of information vary enormously. In general, companies which only survive by making a profit from selling information, are aware of the needs of the market place and the large user usually finds them receptive to negotiation. On the other hand, some of the national information services and those based on learned societies have restrictive marketing policies which may include, for example, territorial limitations and/or a usage charge. Most large companies, having bought information, wish to move it anywhere in the world within the company organization, in any form and without the burden of recording usage. In return, the large company is prepared to negotiate a fair price. It must be remembered that customers do not have unlimited financial resources and they want value for money. Those suppliers who insist on excessive fees could price themselves out of business.

One further vital point on the cost of information. The British government and other national authorities which are in a position of power or monopoly, have a responsibility to British industry. It is to ensure that the services and means of access to recorded information are available to British industry on terms that are similar to those encountered by industry in other countries. For instance, the cost of telephone links to on-line networks cost British industry much more than industry in the United States. This puts British industry at some disadvantage.

Primary journal grading

One advantage of manual searching is the ability to select and reject papers almost as a browsing operation, whilst a computer search of large databases is inflexible and frequently results in large and indiscriminate outputs. 'Chemical Abstracts' is typical of the big databases in that it has too much obscure foreign-language material, contributing to an overloaded system. More often than not, the user wants a few good papers on a subject and not a complete prior art search. Furthermore, the user prefers to have references to papers in journals which are readily accessible.

The secondary services could solve this problem by including a new data element in their databases which would be in effect a 'Michelin Guide' to the primary journals. The important journals held in high esteem would be given a three star rating (or maybe three sets of bookends) whilst a mediocre journal would be one star. A second symbol would indicate journals which publish only refereed papers. A third symbol would indicate the language or languages used.

The grading procedure could be based on a formula which might include size of circulation, citation statistics, number of major libraries holding the journal and so on. Not only would such a scheme help the user, it could also make a major impact on the information explosion, because authors might refrain from publishing in third-rate journals!

If this idea is not acceptable, an alternative would be to develop a list of agreed core journals with an appropriate, searchable data element included in each bibliographical reference. The user would have the choice of searching the core journals or the whole file.

Current awareness services

The current awareness services have two main functions. To keep readers aware of current or advancing knowledge and to aid the selection of articles for reading. It is interesting to consider some of the different forms of current awareness service. For currency, format, ease of reading and browsability, the 'Current Contents' series of the Institute for Scientific Information must receive high praise. Clearly, readers like 'Current Contents' because every copy that is returned to our library has been well and truly thumbed!

The new experimental current awareness service from UKCIS (United

Kingdom Chemical Information Service) is an exciting concept covering broad subject areas in chemistry in the form of full abstracts from 'Chemical Abstracts' on microfiche. Without doubt the readers want abstracts and the acceptability of the first topic, 'Chemical Hazards Abstracts (on Microfiche)', will be monitored with interest. It is this type of broad subject profile which is likely to supersede the alerting bulletins prepared within user organizations.

The computer-aided personal SDI alerting services which have been developed over the last ten years continue to be well liked. The large user with many hundreds of personal interest profiles addressed to a database has found it a cost advantage to run the tapes in-house. The decision to continue this policy or to move to a bureau service is likely to be determined by economic considerations.

Retrospective searches

Probably most users turn to the indexing and abstracting services to retrieve existing knowledge which may help to solve a problem. Regardless of the storage medium and mode of access, the efficient secondary service should enable the user to select significant papers with the minimum of time and effort. Some of the features which influence this process need attention.

Titles

Titles must be descriptive. Frequently the searcher has to make a value judgment on just the title of papers. Also the retrieval capability of many services relies on free-text searching of titles, sometimes enriched by keywords. Authors should be encouraged to improve the titles of their papers. It is regrettable that the titles of patents and patent abstracts are particularly poor.

Abstracts

The main point to make about abstracts is that they are wanted, ideally in all forms of search output. Abstracts are used to sift relevant papers from irrelevant papers. They may be a substitute for the original papers if the papers are not readily accessible or are in an obscure foreign language. Abstracts may provide the required fact or figure, especially in the area of business information, so that further look-up is unnecessary. The user wants abstracts available on tape for search and display, he does not like two-stage look-up systems which involve the provision of a reference and going to the hard copy to obtain the abstract.

In some areas of science, the quickest way to communicate the content of a paper is by drawings, so that abstracts relating to organic chemistry need to display chemical structures and in chemical engineering and other areas of engineering the abstracts must include appropriate drawings. Drawings can be included in printed hard copy abstracts but they cannot be captured by normal on-line interrogation via teletype terminals. Microform stores accessible by machine appear to be the solution and the secondary services should be working on dial-an-abstract systems.

Indexes

Indexes are the key to recorded knowledge. Perhaps this is why indexes engender so much critical comment, usually about the lack of currency but also on their content and structure. There is no apparent excuse for the delay in publication of annual indexes and cumulations which are computer produced—and yet delays occur.

It has been said that the main advantage that printing retains over the newer technologies is the quality of presentation, but most users complain bitterly about the size of the print. In fact, the print size gets smaller as the indexes get larger. The tenth collective index to 'Chemical Abstracts' covering five years will amount to some seventy volumes and take up about twenty feet of shelf space. Who is for COM (computer-output-microfilm)?

By sheer size, traditional subject indexing and manual searching seem to have been stretched to their last gasping limits. This is a problem which all major secondary services face but some of the weaknesses can be illustrated by reference to 'Chemical Abstracts'.

Too often indexing is undisciplined. For example, if the user looks up 'Chemical Abstracts', vol. 71 subject index, on a fairly simple subject, namely the preparation of benzoic acid from toluene, then he needs to consult under the main heading 'benzoic acid preparation', eight different sub-terms in order to retrieve the fourteen references cited. A better grouping of sub-terms is surely possible and this would greatly help the researcher. However, this is not the entire story, in the case of A reacts with B to produce C, all references should be indexed under all three terms A, B and C, and in most cases also under the reaction. In the benzoic acid preparation example just mentioned, only five of the fourteen references appeared under 'toluene reactions' and none under 'toluene, end uses'. Sadly and reluctantly the user starts to recognize an information loss.

In 'Chemical Abstracts' cross referencing in the index to indicate the preferred name (e.g. propanone-2 for acetone) would be much easier for the researcher to use than the Index Guide.

One further point, there is a need for consistent and controlled indexing vocabularies. Obviously these vocabularies need to be dynamic in order to accommodate changes and advances in knowledge but the end user would like the 'hard core of terms' to remain live for a reasonable period of time.

It is not easy to judge the life of an indexing or a coding system because over the years each system represents an information investment. The codes used by Derwent Publications Limited were designed for punch cards, sorted by punch card sorting machines. These same codes have been used in systems for batch searching by computer and are now a major feature of an on-line interactive search system. These codes are too general and do not lend themselves to interactive search. The output is so 'noisy' the user wants to switch off! An improved coding and indexing policy is long overdue. A good keyword retrieval system would improve the text-dependent subject areas. The present chemical codes might be retained to be used as a broad sieve, with a deeper search facility introduced to search any desired sub-set of patent material.

On-line working

On-line working will not be a panacea for all the problems encountered by other search procedures. However, on-line working has one over-riding advantage. Given a terminal, a user has access to much of the world's current literature, literally at his finger tips. The impact of on-line and on-demand searching has hardly been realized. It allows the user to escape from the confines of his own discipline and tap into other subject areas. This will encourage the cross fertilization of ideas, broaden horizons and permit browsing in other disciplines. Another advantage for the user is that he buys information when he wants it and from wherever he wants it. So that the routine purchase of information, as an insurance in case of need, is likely to be a policy of the past.

Although the future looks exciting, it is still fraught with problems for the secondary service database suppliers. A few of these problems can be mentioned.

On-line interrogation does not solve the problems of indexing and vocabulary control for those databases that control indexing terms. Those databases that use clear language search procedures need to present 'synonym groupings' to aid the searcher. It should be possible to search automatically all members of a homologous series in a given range, for example, searching under 'alkane C2–10' should retrieve all citations for ethane, propane, butane, etc., up to decane. 'Chemical Abstracts' needs to exploit the registry number system as an on-line searching facility. On-line searching would be greatly enhanced if a left-hand truncation facility was available.

The design of on-line services needs care. For example, an on-line search of 'Oceanic Abstracts' gave a cross reference to a previous abstract, which was not available on-line, nor was a hard copy abstract readily at hand. Careful database construction should ensure that the cross referenced abstract was available on-line.

It is important that suppliers agree on standardization to reduce the range of variations in the instructions necessary to operate different on-line systems and the various databases on each system. The ease of interrogation of databases on-line would be greatly improved, if there was some subject indexing compatibility between databases and a means of vocabulary conversion, so that a single search query could be addressed to all appropriate databases. These are just a few suggestions. There is much to do and the changes are great.

User aids and training

The provision of user aids and training by the secondary services is an important public relations exercise which the user organizations really do need in order to make maximum use of the resources offered by the services. The user community needs to know more about the procedures adopted by each database supplier such as the philosophies of selection and indexing, as well as some of the more readily available information such as journal coverage and the data elements used in searching, and those displayed in the output. A few database suppliers provide dictionaries or controlled vocabulary lists, term frequency lists, free language keywords or thesauri for controlled terms and these user aids are invaluable to the user.

The supplier should also make provision to inform the large user of changes made in the databases. These changes can include, for example, a change in indexing policy, the addition of a new data element, or amended journal coverage.

Some services provide excellent off- or on-site training for the personnel in the user organizations. This service is necessary and is greatly appreciated.

New business opportunities

The coverage of the literature by the secondary services is reasonably adequate but there are two areas where there is a crying need for a database.

The first is for a database covering European business information. Business information can be defined in ten broad areas as follows:

1. Fields; products; range; capacities.
2. Territories and sectors.
3. Performance and growth (sales; profits; return; costs).
4. Organization; structure; direction.
5. Expansion; investment; divestment.
6. Financing the business.
7. Strategies and policies.
8. Business and society; government; international affairs.
9. Technological change and resources.
10. Employee participation; individual and organization values/social trends.

The US and Japanese scene is well covered by the Predicasts databases and ideally any new system for European business information should match Predicasts and be compatible.

The second, urgently needed, database is a service addressed to chemical compounds and their known toxicological and hazardous properties. TOXLINE is a database which covers references in the literature to the toxicity of chemicals. The chemical industry needs a service which provides actual information and data. In the UK, the Health and Safety at Work Act has exacerbated this need but throughout the world, legislation on toxicological hazards is becoming more rigorous and there is an acknowledged social responsibility to people who handle chemicals through all the manufacturing stages to the end user.

One further point, the secondary services could help their readers by improving the coverage of conferences and also publications from bodies such as OECD and WHO.

To sum up, the abstracting and indexing services need to exploit and make available all the treasures in their databases. This applies to existing facilities and also to additional features that can be derived from these information stores by ingenuity and by utilizing advanced information and data handling techniques. These will be the tools that are needed by today's Merton College and other scholars.

Acknowledgement

I should like to thank my colleagues in ICI for the many suggestions and criticisms which I have attempted to incorporate in this paper.

Summary and conclusions

During the discussion at the end of the day there was a considerable debate on the role of the information centres with respect to EURONET. We were particularly perturbed to hear that both the French and the Germans had done a considerable amount of homework and had prepared details of many databases which they intended to include in the network. After considerable discussion and resolutions from the floor, a resolution with only one abstention was adopted by the whole of the conference and this reads 'that this house requests that Aslib should convene a meeting of those concerned with abstracting, indexing and other related information services in the UK to discuss the possibility of organizing a group to consider the interest and advancement of these services'. On behalf of Aslib a member of the Council undertook the responsibility for bringing this to the Council of Aslib and forwarding the proposal in the usual way. I personally, as Chairman, hope that this is taken seriously and quickly as I do not believe we have much time on our side before we do our thinking and I would like to see far more regular interchange of ideas and experience between the databases in Great Britain and for these to be considered as a national entity. I believe it is an important national asset which we can utilize. First of all on behalf of British industry, to which it is most important, but secondly it is an excellent money earner overseas and that should help our balance of payments, plus also maintaining the lead of these sort of services developed and pioneered in Great Britain.

A. R. PAYNE

Footnote

A meeting of representatives of database producers was convened at Aslib on 28th June 1976, in accordance with the resolution recorded above. At this meeting the plans to form an Aslib Information Industry Group (approved by the Council of Aslib on 30th June 1976, and announced subsequently in *Aslib Information*, were explained; database producers who were interested in the possibility of marketing their services through EURONET were urged to contact Mr J.C.Gray of the British Library or Mr A.C.Nicholas of the Department of Industry as a matter of urgency, and four of the persons present were appointed to organize a further conference on the marketing of tape services overseas and other possible opportunities for the successful development of these services.

It is with the greatest regret that we have to record that Professor A.R. Payne, who chaired the conference on 7th May 1976, with such skill and charm, died suddenly during the summer holiday period. He will be sadly missed in research association and information circles

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Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed at the Alden Press, Oxford

4 FEB 1977

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Aslib Proceedings

EMBER–DECEMBER

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Aslib Proceedings

VOLUME 28 NOVEMBER/DECEMBER 1976 NUMBER 11–12

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Aslib Proceedings *is published monthly and supplied free to members of Aslib. Subscription rates are £20.00 annually to non-members, or £10.00 to Aslib members requiring additional copies. Single copies £1.80, or £1 to members.*

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Aslib Proceedings now accepts contributed papers in addition to those presented at Aslib meetings and conferences. They should be of a practical nature and of some relevance to problems encountered in the everyday operation of library and information units, or services. Other kinds of contribution which will be considered for inclusion are short notes on new information units or special libraries; the introduction of new techniques or systems in existing libraries where these may be of general interest; equipment designed by members for special purposes and put into operation in their own organizations; and objective reports on experience with new 'packaged' commercially available information services.

Contributions, which should be typewritten, double spaced, single-sided on A4 paper, and not more than 3,000 words in length, should be addressed to the Editor, *Aslib Proceedings*, 3 Belgrave Square, London SW1X 8PL. If possible, authors should include a summary of up to 200 words with the typescript. Authors will receive twenty-five offprints of their article free of charge.

Errata

The authors of 'The distribution of community information: the role of the computer and computer-based networks' published in the September 1976, issue of *Aslib Proceedings* should appear as Jean Tague, Carolyn Watters and Michael Shepherd.

Reference 26 in 'Self-teaching and the development of the individual' by P. J. Hills (*Aslib Proceedings*) 26 (9), September 1976, p. 305–13) is: HAMILTON, D. *Curriculum evaluation.* London, Open Books, 1976.

Designing a system: objectives, aims and factors

Peter Vickers

Aslib Consultancy Service

Paper presented at the 50th Aslib Annual Conference, University of Exeter, 20th–23rd September 1976

FACED WITH THE CHALLENGE of presenting the opening paper to this Aslib Conference, it was my wish to offer something rather impressive—a milestone, perhaps, in the literature of systems design. To be perfectly frank, it has not quite worked out that way. My thoughts on the subject changed direction several times during the paper's long gestation. Experiences in the course of its preparation brought new ideas. As a result, what you are about to receive is not so much a Conference paper as an account of my attempts to prepare one.

It all started with the title, which is the only part I did not write. So much has been published on designing systems, and on objectives and aims. Back in the Aslib system design shop, we have shelves full of such books. One treats them with respect because they are written by eminent learned people (consultants, many of them) and they are full of complicated flow charts and diagrams. But to be perfectly honest, they are of little help when it comes to designing a real-life system. And there you have the starting point for the thoughts which follow—the gulf between the theoretical text books and the design problems we face in the real world.

I guess that I have a particular outlook on the problems of information system design because, as it says in the programme, I started out in life as an aircraft engineer. I was taught many years ago how to design aircraft. I learned about aerodynamics, about the calculation of stresses, and the strength of materials. This was a long time ago, and the aircraft industry has changed a great deal in the meantime, but the basic principles are much the same. Somebody prepares a specification for an aircraft, in terms of its speed, range, carrying capacity, take-off and landing characteristics, and so on. And providing that such a machine can be built within the limits of available technology, you can sit down and design it to meet those requirements. I often wonder why we cannot do the same for information systems.

Let me put a comparison to you. The Wright brothers first flew at Kittyhawk in December 1903 and 50 years later we had jet-powered aircraft in commercial service, carrying passengers fairly safely at an economical price. In the 50 years of Aslib's existence, have our information systems changed all that much? Certainly, our ability to design information systems to a precise specification

Aslib Proceedings, 28 (11–12), November–December 1976, p. 356–63. Printed in Great Britain

is nowhere near that which is expected in designing an aircraft. Our design know-how has advanced very little.

I am perfectly aware that there is little resemblance between a tub of feature cards and a Jumbo jet. The only connection between the two is that both should be designed to meet certain performance requirements. The Jumbo has to be able to carry 400 passengers four or five thousand miles at about 600 mph. An information retrieval system should be able to locate document references to certain standards of precision and recall, within a specified time. Both systems, incidentally, usually have to operate within certain cost restraints.

The comparison I have suggested is in many ways absurd and misleading. The aircraft comprises many subsystems—wings, controls, engines, landing gear, and so on—and is itself part of a transport system that requires airports, fuel supplies, navigational aids and so on. The information retrieval system comprises an input subsystem, a storage subsystem, the indexing language, the user interface, and so on. It is useless without a document supply system. But the point I have made is still valid. The aircraft transport system can be quite accurately designed at any of its levels. Any information system is by contrast a very hit-or-miss affair. I think it is time we did something about it.

The theme of this paper reared its head in a working situation recently, in the course of a research project we were doing for the CEC. The aim of this project was to develop models for predicting the costs of mechanized information systems. The models consist of a series of equations for calculating the cost of each component of such systems in terms of staff, materials, equipment and so on. The equations are basically simple—they have to be, because of the lack of reliable data. The models as a whole get fairly complex, because they have to cover so many options in terms of system configuration. We put the equations into a computer, to help with all the sums, and gave an on-line demonstration of the whole thing to the project committee, who expressed great satisfaction with the results. Hooray, we thought, another satisfied client! Then one member of the committee, more perceptive than the rest, said in effect 'but what we *really* want is a model that would predict the cost of a system according to the level of performance required'. That wiped the smiles from the faces of the intrepid consultants! This led, as they say, to a lively discussion, and the occasion reinforced my views about the retarded state of the system design business.

The difficulties faced in designing a straightforward information retrieval system illustrate one aspect of my theme. But the kinds of system design problems that we get thrown at us at Aslib are seldom as neat and tidy as that. Let me describe briefly some of the problems that we have had to tackle in recent years, as consultants, to show you what I mean, and to highlight some other areas where better techniques are needed.

The first example that springs to mind is our largest current project, which is for the Greek Productivity Centre in Athens. Our task there is to set up a technical information service for Greek industry. The subject area is productivity, which means pretty well everything. There is a whole host of problems—social, cultural, linguistic—attached to this undertaking which I will not go into. I shall concentrate on the technical problems, the first of which is the fact that we have to establish this service almost in a vacuum. There is no equivalent of the National Lending Library, no network of specialist information services, very few good academic libraries, and worst of all, no information profession in the sense that we have it in this country.

To return to my aeronautical comparisons, this is rather like trying to design and build an aircraft for a place where there are no airfields, no trained pilots, and limited fuel supplies. Also, we are not sure (and one never is sure when setting up a new national service anywhere) just how many passengers might want to use the aircraft, and what their travelling habits will be.

A survey that we carried out in Greece early this year showed (not surprisingly) a great potential demand for information in many different sectors of industry, and in enterprises of different kinds, from the large to the small. To attempt to meet all these demands at once would be impractical, and the decision as to which sectors should be given top priority was to some extent a political one.

In a situation like this, it is virtually impossible to lay down a precise performance specification for any of the systems required. And even if it were, we would not have been able to design them with any certainty of meeting the specifications. We would not, for example, be sure that the staff, most of whom we have had to train ourselves, would work at the same speed as their counterparts in a UK service. There is no way of telling how long it will take to obtain copies of documents, many of which will have to be ordered from abroad.

In such a situation, the technicalities of the systems are almost insignificant compared with the human factors. But it will be evident that the solution to this system design problem must be a flexible one. Our aircraft has to have an expandable fuselage, and infinitely variable wing geometry. On the sidelines, we are trying desperately to get some airfields built.

Another example that I would like to mention is a project we did for the United Nations Development Programme last year. A decision had been taken by the UN to promote technical co-operation between developing countries. The idea was that better use could be made of the resources of some developing countries, in the form of training and research facilities and expertise generally. Mutual co-operation and assistance should be encouraged so that they could become less dependent on the help of industrialized countries. As part of a much wider programme of activities, it was decided to set up a system whereby such countries could find out what resources others could offer to meet specific needs. We were given the job of designing this system.

Here was a situation where it was possible to specify fairly accurately, with the clients' help, what kinds of services the systems would have to provide. It was essentially an active referral system. Recall was more important than precision; up-to-dateness was fairly critical; ease of use was essential; coverage should be as complete as possible. Note that we cannot specify numerical values for most of these, but at least we have an idea of the kind of machine we need.

The real problem was that of getting hold of the input for the system, and that is really the point of this example. For when we step outside the familiar world of published information, we add another dimension to our system design problems. Here we were dealing with a system that would not draw its input from journals, books and reports, but which needed information about the resources available within each country.

The whole idea could only succeed if sufficient information was pumped into the system for it to achieve some useful results. But given that about 100 countries would be involved, with many different political systems and different stages of development, how could one design procedures to ensure that they would supply the facts and figures required? Here we were able to design the aircraft the customer wanted, but with no guarantee that there would be enough fuel to take off.

Another kind of design problem is illustrated by a firm that we visited recently. This firm is in the reprography business making equipment and materials for offset lithography and similar processes. Their information service was slowly disappearing beneath a mountain of edge-notched cards that served as their literature index. It turned out that much of the literature of interest to their engineers and research staff could be found in *Chemical Abstracts*. The reason for re-indexing it was that the indexes to *Chem. Abs* are not suitable for their purpose. They can locate papers on a given photosensitive chemical compound, but not on its application to a specific process.

This latter example reveals two more aspects of systems design. The first is the perennial problem of changing over from one established system to another. We could envisage several better ways of indexing 20,000 documents than using edge-notched cards, but to make any retrospective conversion was going to cost a fortune. The original system had long outlived its usefulness, a not uncommon state of affairs. Aeroplanes are designed for a limited life, but information systems always seem to be established on the assumption that they will last for ever.

The second factor to emerge is that situations of this kind sometimes reveal a lack of research in certain areas; and all too often there is not the time or the resources to get that research done. It seems to me that an information unit of this kind could be helped by a central service that would strip the required references from the *Chem. Abs* data base, add the specialized index terms required to each record and produce a nice tidy printed index for them each month —rather like the cataloguing service that BLBSD provides, based on MARC tapes. I wonder how many information units could use such a facility? I wonder what it would cost to provide the necessary software? I wonder what such a service would cost, in comparison with the cost of maintaining an equivalent system in-house?

I have so far rather neglected the 'aims and objectives' part of the title of this paper. Here is an example of a systems design problem that is concerned with aims and objectives.

There was a news agency whose main task was to supply a regular news service on Middle-Eastern affairs to a certain newspaper in a certain Middle-Eastern state. Their main sources were press cuttings, and they filed these by subject so that their clients could come back occasionally for some background on any current topic. As often happens, the filing system was beginning to split at the seams. So they came to us and asked, could we advise them on how to design a better filing system? And while we were about it, would it be a good idea if they turned their one-client service into a news bulletin which could be sold more widely on a subscription basis? And at the same time, should they think about putting the whole thing on microfilm?

As you see, there was not one problem but several, and not a single clear objective in sight—unless you count the objective of making a profit. It was impossible to think about a better filing system without knowing what it was for, and who was to use it. The idea of a news bulletin raised the possibility of producing an index to that, and discarding the press cuttings. The idea of using microfilm gave rise to a whole range of alternative possibilities. But what were the aims and objectives of any of these possible systems?

The aeronautical analogy here would be to give the designer an engine, and say—what is the best aircraft we could hang this on to?

I hope that these examples give some idea of the infinite variety of real-life systems design problems, although none of them illustrates neatly the basic theme I originally intended to develop. Let us now return to the specific problem of designing an information retrieval system. To make it as simple as possible, let us assume that we are designing a system for an internal reports collection, so that coverage of the literature will be 100 per cent. We then have two kinds of quantifiable performance criteria: response time, and recall and precision.

We can, within limits, design a system to achieve a specified response time—both with respect to the time taken to get references *into* the system, and the time required to get them out. Whether the system is manual or mechanized, it is possible to estimate, or determine by experiment, the average time required for each operation. It is worth pointing out that the required speed of response at the output end of the system may vary from weeks to seconds—the range is very wide. But whatever the requirement, it is possible to select a system configuration, and determine the number of operations and pieces of equipment needed to achieve a specified response time. The important point here is that there is a common standard for the measurement of time, and both the system designer and the system users understand it.

However, when we consider the criteria relating to retrieval performance, the picture is very different. Some of you may dispute this, but I do not think that one *can* design a system to achieve specified levels of recall and precision, or recall/precision ratio. The reason is simply that we have not established clear-cut relationships between these measures and the factors that influence them. And even if we could, I am not sure that these measures correspond to qualities of an information system that users can recognize in a quantitative way.

The greatest single obstacle to progress here, in my view, is that we know and understand so little about the psychology of information use. This obstacle is reinforced, moreover, by a widespread tendency among information people to think of users as 'them'—as a different sort of animal from the rest of us—that should be trained from the cradle to accept gratefully all the abstracts journals, annotated bibliographies, catalogue cards, and documents that we shower upon them. The truth is that we are information users, too, with the same natural aversion to many of the characteristics of the services we offer to others. I ask you, in what terms would you define the kind of information service that you would like to receive to help you do your job?

Two important characteristics that I believe many people look for in an information system are simplicity and reliability, above all else. This reminds me of another aeronautical analogy. A famous aircraft designer, many years ago, said that the secret of designing successful aircraft was to 'simplicate and add lightness'.

You may feel that this whole attempt to draw parallels between designing an aircraft (essentially a mechanical apparatus) and an information system (with its large human element) is unfair and unreasonable. Perhaps you are right. Perhaps we shall never achieve the same capability for design to meet a precise specification. Let us then look at the way we go about designing an information system now, and see what scope there is for improving the fumbling methodology that we have.

The basic steps involved in systems design are expressed differently in the several textbooks on the subject, some of which are heavily biased towards computer systems. The steps described in B. C. Vickery's *Information Systems* are typical, however, and correspond more closely than others to the approach that we use in our work. To anyone interested in the subject of systems design, incidentally, I strongly recommend this book. The steps are as follows:

1 Definition of the system to be designed, in terms of objectives.
2 Collection, analysis and interpretation of data relevant to this system.
3 Overall design of a system with estimates of its technical, economical and operational feasibility.
4 Detailed design and costing.
5 Realization of the design by practical implementation.
6 Evaluation of the implemented system in terms of objectives.

The first two steps, definition and data collection, are closely interrelated. The client organization may have an initial idea of the kind of system that it needs which may be modified in consultation with the system designer. As the data is collected and analysed, the definition of the system can be progressively refined and made more specific. This process of improving the definition is largely a matter of human interaction, and I do not think that we can formalize it to any degree. The collection of data, however, often includes what is known in the trade as a user survey. We believe that we do this kind of thing rather well, but I submit nonetheless that we have barely scratched the surface of the development of user survey techniques. A lot needs to be done to improve these techniques, and to make them more effective in indicating how the system should function.

Step 3 is referred to in some textbooks as the feasibility study stage. The idea is that having determined the system requirements and restraints, the designer identifies a whole range of possible solutions, and then compares their technical, economical and operational feasibility—hopefully on the basis of their cost-effectiveness and/or cost/benefit, both thorny subjects which I will rapidly gloss over. In practice, of course, one seldom goes through this process in a meticulous, methodical way. All too often, one has to dismiss certain possibilities for rather unscientific reasons, such as deep-rooted prejudice within an information unit against a certain technique. Where economics are concerned, it is often difficult to be totally objective; so much depends on *whose* costs we are trying to save.

Step 4 is detailed design and costing. This brings us back to the point I was making earlier about our limitations in designing the system to meet the definition arrived at in step 1. I can also state, with feeling, that our methods of cost estimation are far from precise. We can estimate reasonably well the time and effort required for operations carried out by people, and we are lucky here in that if we say that it takes 20 minutes to write an abstract, the production rate of abstracts can be controlled so that it matches that figure. But beyond that there is a hazy area. How do we estimate the cost of the management effort and clerical support needed to keep the whole thing going?

After implementation (step 5), the idea is that we evaluate the system and then go back and twiddle the controls until it delivers the goods to the standard originally agreed. This is fine so long as there is enough scope for adjustment. The original design must not be too far out of line. Our clients would not be amused if we went back to them a year after setting up a system. and said that our evaluation showed a need to double the staff. It could be even worse, under present legislation, if there was a need to get rid of some of the staff!

I do not of course wish to give the impression that we system designers are grossly incompetent. On the contrary, we do a marvellous job. But I do stress that present methods are somewhat crude.

To round the whole thing off, I would like to recapitulate the main points that emerged from the examples I have described.

Firstly, there is the fundamental problem of defining the objectives of the system, in terms that all parties understand. The literature shows that information people have been groaning about this difficulty for a long time. Why is nothing happening?

Secondly, our systems depend very much on the behaviour of human beings, and I do not believe that we are making full use of all that is known about such behaviour. I am referring here both to the behaviour of information users who, as I stressed, are ordinary people like you and me, and to the staff who operate our systems. We need to learn much more about ways of investigating peoples' use of information, and about the effective control of the human element in our information systems.

Thirdly, we need more research in certain areas where ignorance is hampering our systems design. The example I quoted, you will remember, concerned the local enhancement of available data bases, but there are others. We try to do such research at Aslib, of course, but there are never enough resources to develop all the ideas that arise.

Fourthly, our list of performance criteria was first proposed by Cyril Cleverdon in 1964, and so far as I can discover, has not changed significantly since. I do wish that some practical genius would develop measures of retrieval performance that the user could recognize in a quantitative way. Or, alternatively, perhaps we need better ways of applying the measures we do have to the problems of design.

Lastly, there was the small but significant point that we should design our systems for a limited life.

Let us end with a farewell tribute to those heroic aviators, Orville and Wilbur Wright, who broke the gravity barrier some 70-odd years ago. Didn't they do well! May it not be too long before our information systems really get off the ground.

Management tools: their use in the design, development and operation of information services

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Paper presented at the 50th Aslib Annual Conference, University of Exeter, 20th–23rd September 1976

EVAN A CASUAL glance at any work on management techniques, such as the Glossary[1] prepared by Argenti and Rope for the BIM, discloses a bewildering array of tools available to tackle almost any management problem. I could not hope to discuss many of these without quickly producing mental indigestion through names not remembered and jargon not understood. My hope is instead to give you an awareness of the role which some of these techniques can play and an appreciation of a disciplined approach to solving problems and making decisions.

In ICI, training in this field has evolved over 20 years and I must acknowledge the contribution of past and present colleagues to the development of what I shall be saying. A much fuller exposition of this material is included in *Problem Solving for Management*[2] written for the IWSP by Raybould and Minter.

Management is, of course, not solely concerned with solving problems. It is also concerned with making decisions and with creating and exploiting opportunities. But these are all inter-related and a study of problem situations is a useful place to start. In fact it is fundamental to our approach that analysis of the problem is the right way to start. Too many problems are not solved because they are never properly defined.

There are several ways of classifying problems, *e.g.* the purely technical *vs* those concerned with people. The most difficult are often those in which these are bound up together. We have found it more helpful to think in terms of the type of question being asked (Figure 1). Some problems seem to fit snugly into one of the categories listed, but on probing most have an element of each. Frequently a problem is stated simply as a choice between alternatives when, on reflection, one realizes that many possible solutions have been omitted or when one does not have any clearly-defined basis for making the choice. Thus, whatever the *prima facie* nature of the problem, it is usually worth considering the elements of each type it contains and taking them in logical sequence. They thus become phases in a generic problem rather than separate problem types.

In Figure 2 this sequence is put into the context of the total problem system, starting with recognition that a problem or an opportunity exists (or is likely to exist) and proceeding to implementation of the chosen solution so that some

DIAGNOSIS—What has gone wrong?
What is needed?

INNOVATION—Is there another way?

OPTIMIZATION—Which way suits us best?

FIG. 1: *Problem classification*

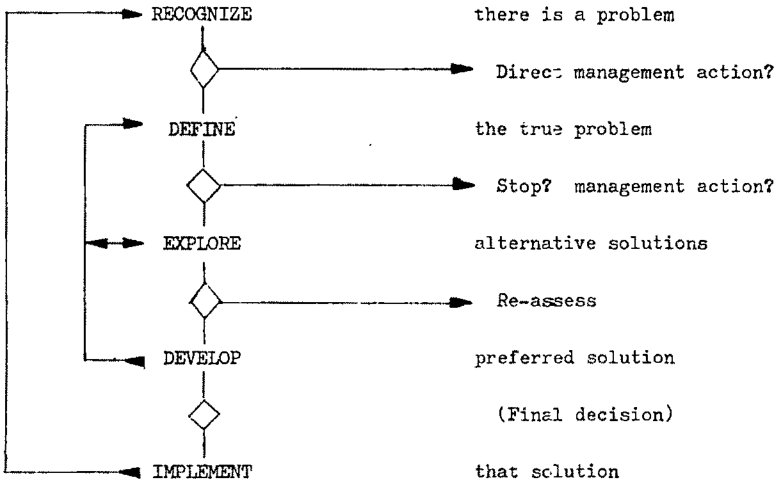

FIG. 2: *Problem solving process*

change is brought about. This model indicates that there are decisions to be made at each stage, leading up to the final decision on implementation. It also allows that in practice we cannot be quite so systematic—the human brain is not so disciplined—and we may need to loop back. We should loop back from implementation to recognition to monitor the effectiveness of our action.

We do not claim originality in this approach—it is embodied in various forms within many disciplines—but we try to describe it in basic terms because we believe that it is vital to understand this before one can select a technique appropriate to one's needs.

Having now analysed the problem-solving process, let us see how we can function within it. Many of you will be aware of the writings, in both specialist and popular forms, on 'Creative thinking'. I think this is a misleading name which hides for some people its relevance to all of us, whatever our roles. My

ANALYTICAL	CREATIVE	JUDICIAL
Logic	Imagination	Experience
Rational	Irrational	Evaluative
Unique answer	Infinite range	A few possibilities
Predictable	Unpredictable	Semi-predictable
'Vertical'	'Lateral'	Historical

FIG. 3: *Modes of thought*

purpose in mentioning it now is to put it in its place alongside 'Analytical' and 'Judicial' thinking as three modes in which we can encourage our brains to function. Some people feel happiest and most natural in just one mode, but all three have their uses and it is worth recognizing these and developing the facility to apply each mode as appropriate to any current task. They are summarized in Figure 3. We cannot afford to function in one mode exclusively as they are complementary. One may think of diagnosis as being a primarily analytical process, but a little creativity can help uncover the steps in the logic which our fallible brains have missed. Innovation is primarily creative, but there are systematic, logical ways of generating alternatives as well as imaginative ways. Optimization, or choice, is largely a matter of judgment, but the effective decision is often the creative one which gets away from precedent.

This leads to a word or two about decisions. It is axiomatic that 'decision' implies alternative courses of action with some element of doubt about outcomes: not all the facts are known or knowable; they may be open to different interpretations; they may be indistinguishable from opinions. Among the most difficult decisions are those which involve people; these are subject to emotion as well as logic. This is where it is important to realize that if many factors and many people are involved the decision is unlikely to be effective unless all the key factors have been considered, all the people involved have been recognized and the effect on them is allowed for. Ideally these factors and these people are identified when the problem is defined. Another important, but frequently neglected, step in the decision-making process is the deliberate search for potential adverse consequences before the decision is actually taken. This is how the robustness of the decision is tested before it is too late.

Having now outlined a general approach and the modes of thought we can apply, let me use the remaining time to introduce a few techniques which embody those principles, drawn from a wide spectrum.

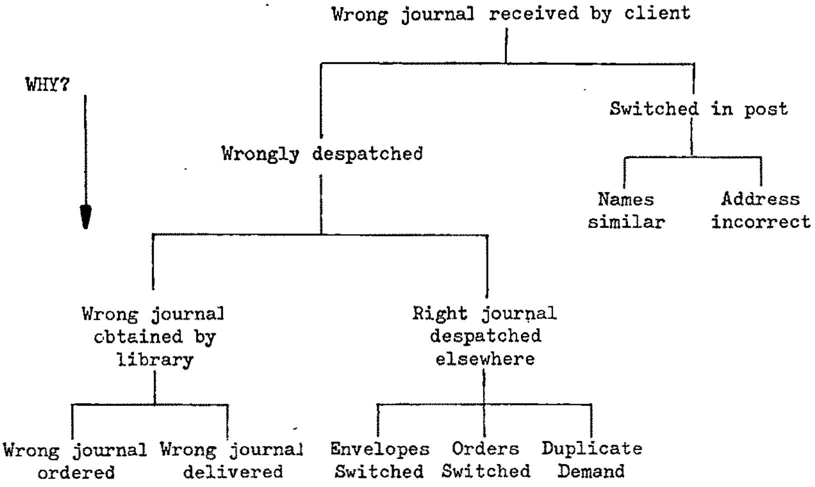

FIG. 4: *Logic Tree*

For diagnostic purposes, let us use a logical, analytical tool called a Logic tree. Figure 4 illustrates this by analysing possible causes of a wrong journal being received by a client. This is not a complete analysis but it is sufficient to illustrate how persistent use of the question 'Why?' and a search for one or more other possible answers at every stage can open up the mind.

To open up the mind at the exploratory phase many of you will already have come across 'Brainstorming'. This technique is quite widely known, but not always well applied. It aims to pool the efforts of a group of people in order to generate ideas. The actual Brainstorming session is thus only one stage in the total process—to be effective it must be based on a proper analysis of the problem and it must not be expected to come up with a fully developed solution. Its sole discipline is the self-discipline of the participants in observing its four ground-rules given in Figure 5. A relaxed atmosphere is vital, in which the participants are at ease and genuinely seeking a new light on the problem. All ideas should be captured and the result should be a long list which is subsequently sorted—individual ideas being grouped, combined, developed so that a short list of composite proposals can be evaluated. This technique is useful when trying to make a start, to break new ground, particularly in non-specialist fields where the varied experience of a wide range of people can be helpful.

Suspend judgment
Freewheel
Quantity
Cross-fertilize

FIG. 5: *Brainstorming*

To illustrate a combination of systematic analysis and creative thought let me now outline the technique known as 'Critical Examination'. This is used typically in a process improvement situation where one starts with a rigorous questioning of *what* the process is designed to achieve and *why* before looking at how it is done now or thinking of how better it might be done. The technique is encapsulated in a very few words in Figure 6. The first two columns provide

FACTS		ALTERNATIVES	Considerations for developing
WHAT is achieved?	WHY?	WHAT ELSE could be?	
HOW is it achieved?	WHY?	HOW ELSE?	
WHEN?	WHY?	WHEN ELSE?	
WHERE?	WHY?	WHERE ELSE?	
WHO?	WHY?	WHO ELSE?	

FIG. 6: *Critical Examination*

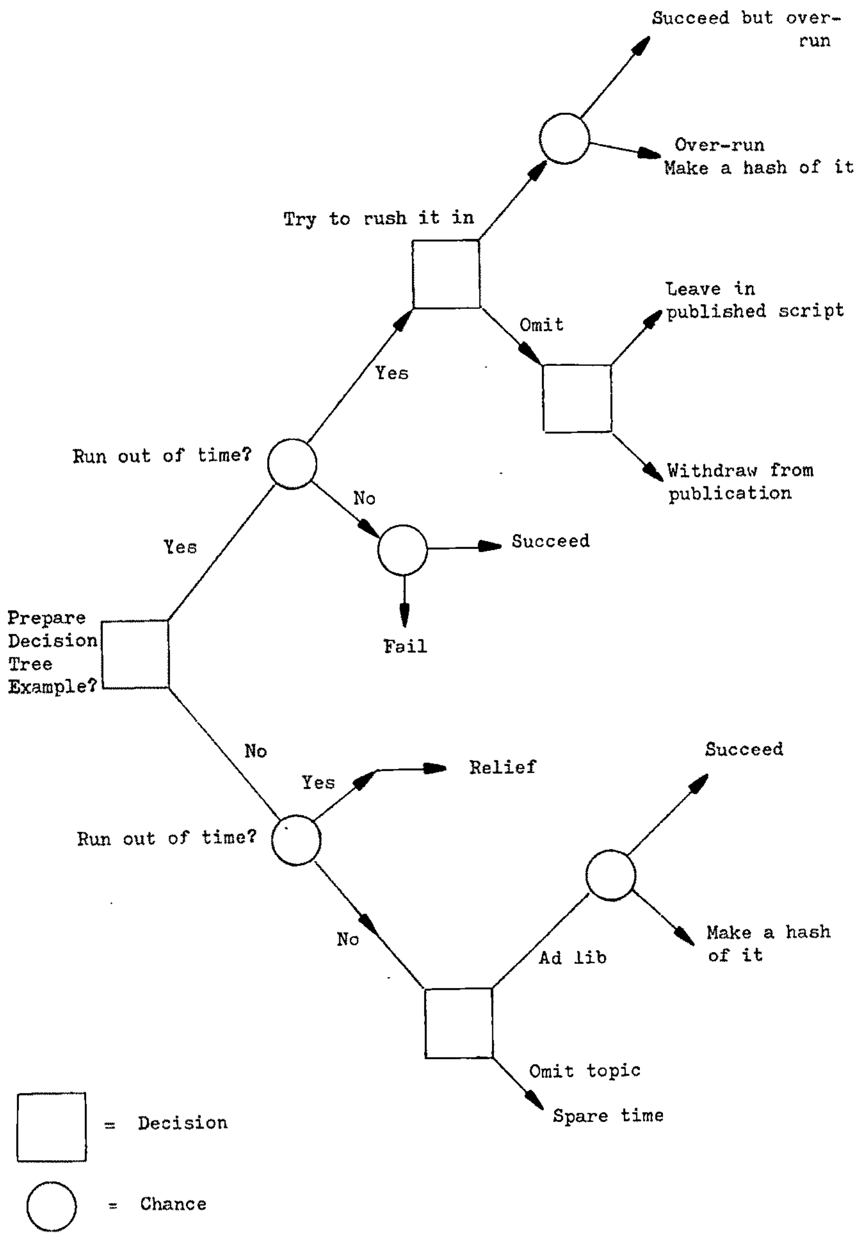

FIG. 7: *Decision Tree example—The lecturer's dilemma* (*note: the first decision to be made when preparing the lecture in advance—subsequent decisions may be faced during the course of the lecture*)

the framework for a systematic and rigorous analysis of the existing system—or the proposal, if the technique is applied at the design stage. They embody a searching use of the question WHY? both to look back to causes and to look forward to purposes. They are designed to give a thorough understanding of the present situation, its strengths and weaknesses.

The third column represents the creative phase in which opportunities for change are generated. The approach is that of Brainstorming on each aspect of the system in turn and it is usual to assist the process by means of a check-list of simple trigger-words such as Eliminate; Avoid the Need; Substitute; Modify. As in Brainstorming, evaluation of the ideas is deferred to the next stage and the fourth column provides the basis for this. The technique does not produce directly the solution to a problem but it produces a pool of thoughts, some old, some new, some impossible but some stimulating from which a novel solution can be synthesized.

Critical Examination has been used in a tremendous range of situations—problems large and small—technical, commercial, organizational. For a major study it can provide the structure to guide a team—ideally three or four—but it can also serve to help the individual marshal his own thoughts.

I should like to mention just one of the techniques at the decision end of the spectrum. Many of the techniques here are highly specialized and mathematical Operations Research techniques. From these I have chosen one which can be effectively used in simpler, qualitative form by the layman. This is the Decision Tree. It has a similarity with the Logic Tree in that it displays and analyses the logic of a situation, but in this case looking forward to the possible future consequences of a decision or series of decisions. By identifying separately those events which will be within our control from those which will not—the twin factors Choice and Chance—it helps us to structure our thinking about them and stimulates us to make sure that vital branches are not ignored. Just two symbols are used, as illustrated in Figure 7. To turn this into a full quantitative technique it is necessary to assess the value of the various alternative outcomes, the costs of following each path and the probabilities at each chance node.

The four techniques I have touched on represent a small part of the tool kit available to the manager. The skills they require are ones which he can acquire with a little practice. The selection of any tool from the kit depends on a clear understanding of the use to which it is to be put. Its effective use depends on the right approach by those involved and a proper concern for those affected. But that is the subject of subsequent papers today.

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Selecting the right people

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Paper presented at the 50th Aslib Annual Conference, University of Exeter, 20th–23rd September 1976

IT IS WITH a deep sense of humility that I even dare to speak on the subject of 'Selecting the right people' since I am very much aware that everyone is their own expert on people. What I have to say is fundamentally so simple that I am likely to leave myself open to accusations of trying to teach my grandmother to suck eggs. However, I have seen so many grandmothers blow, scramble and in other ways disintegrate their eggs that I make no apology for a very basic approach to the subject.

The importance of choosing the right people

We are considering at this conference 'the effective use of information services' and it is important to realize that, however automated the system, the blend of skills in the people involved in working it and their capability to work together will determine to a large extent how useful that service will be. Employing people with inappropriate skills or experience or an incompatible personal make-up will certainly disrupt effective working between groups involved. It could result in loss of confidence on the part of customers to such an extent that the service is of no use at all.

It is thus worth putting a great deal of effort into finding the right people and a disciplined approach to the selection process will greatly minimize the risks of employing the wrong people. So, how should this be tackled?

How do we know what we are looking for

Before we actually get to the step of choosing anyone we need to know the nature of the job to be filled and the sort of person that is required to fill it. The process can be represented in a single diagram (Figure 1).

Identify the nature of the vacancy

Very rarely is sufficient attention given to determining what the vacancy *really* is. Where a new section or department is being created the relevance of the envisaged job to the objectives of the section has normally been considered, together with its relationship to other jobs in the section. This very rarely happens where vacancies arise through normal wastage or through expansion of existing sections. I do not want to get involved deeply in the fascinating subject of organizational analysis but I do want to point out that there is often

Aslib Proceedings, 28 (11–12), November–December 1976, p. 370–5. Printed in Great Britain

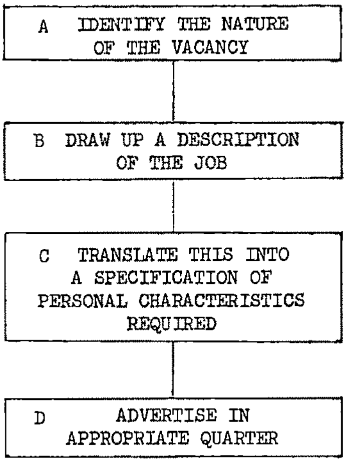
A IDENTIFY THE NATURE OF THE VACANCY
B DRAW UP A DESCRIPTION OF THE JOB
C TRANSLATE THIS INTO A SPECIFICATION OF PERSONAL CHARACTERISTICS REQUIRED
D ADVERTISE IN APPROPRIATE QUARTER

FIG. 1: *Choosing the right people—first stage*

an opportunity to change this situation and thought should be given before just going ahead with filling the vacancy exactly as it was. Perhaps existing jobs could be enriched by not filling it at all, or perhaps future inefficiencies could be avoided by filling it in a different way.

Draw up a description of the job

This is a statement of the overall responsibilities of the job and the main tasks involved in carrying them out. It should also contain a statement of the chain of command. If possible this should be prepared by someone who has actually carried out the job as it is hard to believe just how unrelated to reality job descriptions can be when written from afar.

Translate this into a specification of personal characteristics required

This is in effect a translation of the job requirements into people characteristics. It is absolutely vital at this stage to be practical—we are looking for the right people but must not confuse the issue by specifying paragons. Therefore specify only those attributes that are necessary for the person to fill the job

i PHYSICAL MAKE-UP
ii ATTAINMENTS
iii GENERAL INTELLIGENCE
iv SPECIAL APTITUDES
v INTERESTS
vi DISPOSITION
vii CIRCUMSTANCES

FIG. 2: *Seven Point Plan*

in question in that particular environment and distinguish between those characteristics that are absolutely essential in an incumbent and those which are desirable only.

As far as the characteristics themselves are concerned a useful guide to preparing the specification is the Seven Point Plan developed by Alec Rodger at the National Institute of Industrial Psychology (Figure 2). This looks at personal attributes under seven headings, which are used as a framework for interviewing as well as for drawing up specifications. This gives a context within which to develop a picture of the sort of person required. The following types of quesquestions arise:

i *Physical Make-up*
Are there age limitations? Are there reasons why applications can only be entertained from one sex? Could a disabled person do the job?

ii *Attainments*
What educational level does the job require? What training and experience is either essential or desirable?

iii *General intelligence*
Is above average intelligence required?

iv *Special aptitudes*
Is mechanical aptitude/computer aptitude/languages ability, etc., involved?

v *Interests*
Is someone with specific interests likely to be a better candidate?

vi *Disposition*
What type of person does the nature of the job, or the departmental environmental, entail? Does it require a leader or a follower? Would it suit a loner?

vii *Circumstances*
Does the job require the holder to be highly mobile? Are there any requirements for unsocial hours, dirty conditions, etc? What development prospects does the job offer?

Advertise for applicants

Having got a good idea of the type of person required all your hard work will be of no avail unless the vacancy is promulgated in the right area to attract the right candidates. There may be good candidates within your organization, or you may have to launch an external recruiting campaign. The work done so far will help you to decide whether the most appropriate approach is a local or national advertisement and whether that should be of a general or very specific nature.

How do we choose the right person?

It is important, first of all, *who* does the choosing. It is vital that the manager who will be responsible for the work of the person ultimately appointed should have the main voice in the selection procedure, even to the point of having a veto if necessary. Only if the future boss is thus involved in the process will the necessary commitment between manager and subordinate be assured after appointment. Normally the manager will be supported in the procedure by a

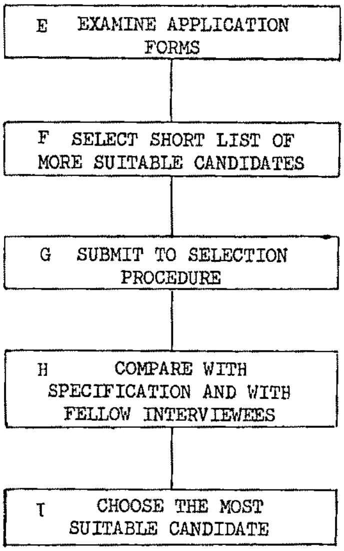
E EXAMINE APPLICATION FORMS
F SELECT SHORT LIST OF MORE SUITABLE CANDIDATES
G SUBMIT TO SELECTION PROCEDURE
H COMPARE WITH SPECIFICATION AND WITH FELLOW INTERVIEWEES
I CHOOSE THE MOST SUITABLE CANDIDATE

FIG. 3: *Choosing the right people—second stage*

personnel specialist and hopefully his advice would be taken into account in arriving at any decision.

The second stage of the process can be expressed in a simple diagram (Figure 3).

Examine application forms

A well-designed application form can simplify this process immensely and it must be relevant to the job level involved—a form for junior clerical staff can require very little information whereas one for applicants to a graduate training scheme may require the candidate to write his views on some topic as well as giving a wide range of personal details.

Select short list of more suitable candidates

If a large number of candidates is forthcoming it may be necessary to do some pre-selection of those who will be considered. This is always a hit and miss affair, but a good application form enables this step to be taken without too many misses. It should be possible to relate the application form to certain aspects of the personal specification prepared in Stage 1 and pass or reject candidates on the basis of how well they compare.

Submit to selection procedure

Those who are brought forward to the next stage of the selection procedure will almost certainly undergo an interview which may be supplemented by tests of one sort or another. The tests may be to determine physical characteristics (such as colour blindness), intelligence, aspects of personality, or aptitude whether verbal, numerical, spatial, mechanical or clerical. Tests are a subject in themselves and should be approached with caution. On their own they mean nothing, but carefully administered, well validated tests can be used as reliable indicators in personnel selection procedures so long as they have been fully proved in the environment of that particular organization. Other tests include discussion groups or other task oriented groups where the performance of individuals can be seen in relation to that of some of their peers rather than in the rarified atmosphere of the interview room.

The interview itself is still the main part of any selection procedure as it gives a candidate and a manager the best opportunity of deciding whether they could work together. In it the manager and personnel specialist have got to find out sufficient about all candidates to decide how well each would do the job and which would be the best incumbent. However, the interview has to be a two-way process enabling the candidate to ask questions as well.

It is essential to plan the interview, but not to such an extent that relevant issues which come up cannot be explored. To this end the Seven Point Plan can again be used to give a framework to the questions posed to the candidate.

i *Physical Make-up*
Are there any defects of health or physique that may be of occupational importance? How agreeable are the candidate's appearance, bearing and speech?

ii *Attainments*
What type of education have applicants had? How well have they done educationally? What occupational training and experience have they had already? How well have they done occupationally?

iii *General intelligence*
How much general intelligence can they display? How much general intelligence do they ordinarily display?

iv *Special aptitudes*
Have they any marked mechanical aptitude? manual dexterity? facility in the use of words? or figures? talent for drawing? or music?

v *Interests*
To what extent are their interests intellectual? practical—constructional? physically—active? social? artistic?

vi *Disposition*
How acceptable do they make themselves to other people? Do they influence others? Are they steady and dependable? Are they self-reliant?

vii *Circumstances*
What are their domestic circumstances? What do the other members of the family do for a living? Are there any special openings available for them?

Specific questions will be suggested by the personal specification compiled at Stage 1.

Careful questioning with open-ended questions, so that they give their views, exploration of recurrent patterns in their lives and investigation of their interests will give you a much greater understanding of the candidates. This will enable you to put a rating to their suitability for the job and the standing of each in relation to the other candidates. This is the basis for the final choice.

One word of warning: having made your choice, deal kindly with the unsuccessful candidates, since they may be your right choice for the next vacancy and you do not want to drive them away.

Conclusion

I will conclude by stressing the need for a disciplined approach to the business of selection—an approach which will be governed by the following basic steps noted earlier.

A Identify the nature of the vacancy
B Draw up a description of the job
C Translate this into a specification of personal characteristics required
D Advertise in appropriate quarter
E Examine application forms
F Select short list of more suitable candidates
G Submit to selection procedure
H Compare with specification and with fellow interviewees
I Choose the most suitable candidate
J Deal carefully with unsuccessful candidates

This will enable selection of the right people to play its part in the effective operation of the organization.

Realization of staff potential

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Paper presented at the 50th Aslib Annual Conference, University of Exeter, 20th–23rd September 1976

MY BRIEF IS to discuss the realization of staff potential, and it seems to me to be essential to consider this question in relation to our current and likely future situation within library and information systems and their operational environment.

In the UK of 1976 it is said that we are either in the middle of an economic crisis, or that hopefully the end is in sight. But at whatever point of a crisis we have reached, we know that economic problems have caused employers in all sectors to look closely at expenditure in every department of their organization, including information and library services. Gone are the free-spending days of the 1960s when expansion of services was taking place, and the talk of conferences was of new buildings and accommodation, whether to subscribe to new bibliographic services on offer, and of the additional staff and new specialists being recruited to operate services. To leave an information or library school at this time meant being offered a choice of interesting posts at attractive salaries, and many young professional workers entering the profession in the 1960s gained rapid promotion to posts of considerable responsibility. Today the talk is more likely to be of no new accommodation, the problems of affording to subscribe to basic bibliographic services, and not of recruiting staff, but possibly of how to cut back on staff costs.

In recent years professional education has changed radically, which has presented problems for managers. From the days of part-time qualifying courses which were highly valued by industry there has been a shift to a situation where at qualifying level there are fewer opportunities for part-time study, and the practice now is to recruit a person who is a graduate or post-graduate in library or information studies having only a very short period of practical experience in the field before taking up a professional post. The schools have also produced students in greater numbers, and this coupled with the tendency of women not to leave their careers at an early age as had been assumed some ten years ago, and the tightening labour market, has produced a situation where there may be too many qualified people chasing too few jobs.

Finally we would also seem to be reaping the benefits of what the profession has been preaching over the years, in that people have realized that information and library services are useful to them as individuals. Users are beginning to shout when they are faced with cut-backs in the services offered to them, and as money flows in shorter supply, organizations place greater reliance on the

Aslib Proceedings, 28 (11–12), November–December 1976, p. 376–81. Printed in Great Britain

rate of flow and quality of information that they require in their daily operations.

So it is possible to present a scenario where it is difficult to see that budgets will increase substantially in real terms in the near future. Although a wage freeze is operating, the total costs of employing staff are still rising. At the same time changes in professional education have had repercussions within operating systems. Recently qualified staff may have received a better basic professional education, but they require more on-site training and persuasion to adapt to local operating conditions. The newer members of staff may well be, on paper, better qualified than staff of longer standing, and this might produce a sense of dissatisfaction, particularly within the smaller systems. The career prospects for the young entrant have changed; the average age of all workers in our field is falling; following re-organization in all sectors there are fewer posts for heads of systems; staff are likely to have fewer opportunities for mobility within the profession in the foreseeable future. However at the same time as we are experiencing these additional staff problems we have a demand to maintain and probably expand the services offered and at a lower cost.

We have then staff who are increasingly expensive to employ, who have as a group changed in their qualities and aspirations in very recent times, and from whom we need to get the maximum effective output of services.

This is where the very difficult questions arise for managers. The design of a system is a challenge; monitoring the operation of the emergent system and the preparation of staff specifications present different sets of problems. However, getting the system to function depends on staff already in post and those who may be added. To take a staff with many strengths and some weaknesses, and recruit others to yield the right mix of technical skills, personal qualities and personalities is no easy task; and then to get them to work together effectively adds grey hairs to the head of any manager.

Having briefly noted a few of the major environmental changes which affect the operation of systems, attention is now turned to the operating staff themselves. As suppliers of documents and information, the librarians among us may turn to the work of other specialists to assist in solving problems. The difficulty is deciding which group of specialists may best help. There is the professional literature concerning staff management and training in the library and information field; the field of personal management, and of management in general and perhaps the psychologists may be able to throw light on the difficulties. However, there is some sensible advice given by Stafford Beer[1] when he suggests that we should look not so much in the field of psychology but turn to social anthropology. He considers that when looking at the question of operating systems it may be more helpful to talk about tribal customs than about logical analysis, about myths and taboos, rather than understanding and intellection, about conversion rather than conviction.

Beer[2] also gives an appropriate set of objectives which may be of value to guide operating staff when he states that the problems of information management are:

not so much of data acquisition as of right storage
not so much of storage as of fast retrieval

not so much of retrieval as of proper selection
not so much of selection as of identifying wants
not so much of knowing wants as of recognizing needs
and the needs are precisely the requirements of system equilibria.

It is tempting to take other ideas from Beer's writings but this has been resisted and attention is now favoured on the individual staff member.

A manager is unlikely to get the best from the staff unless there is an *understanding* of the *individual*, and of the conditions of work that are likely to give the greatest output. At a management level it can be said that people should be employed to the best of their abilities for as much of the time as is possible. Managers must recognize that people work for a variety of reasons, and that these may change with time. There is the basic need to earn money, the social need to work among a community (this usually rating high with workers in our field) and there may be dependency needs upon bosses and colleagues, and possibly psychological needs for power and influence. Maslow[3] has stressed the need that people have for incentives in their daily work. In the library and information field these include the possibility of mobility between a variety of different types of organizations; reasonable financial rewards; job satisfaction in helping to solve other people's information problems; direct contact with other human beings. Other possible incentives are flexible working hours, and contact with other professionals such as we will enjoy during the next few days. This is what can be offered, but what do we require from staff? Firstly we need the basic technical skills appropriate to the job they hold. Secondly those personal characteristics which are needed in our field, of which much is written in the professional press. But above all they need to be good listeners, to be able to communicate at all levels within an organization, have the ability to work well with their colleagues, and be adaptable to change, for systems are not static.

In assessing staff potential the methods used will vary between the different types of parent bodies and the varying sizes of organizations. In the large industrial firm and public authority having a sensitive personnel or staff development department, guidance and support will be available at a sophisticated level. Computer files will record considerable detail about staff which will be gathered systematically on a regular basis. Such help is also being made available to units operating within local authorities, but as yet there may be little help available to those working within academic institutions. In such a circumstance the information is likely to be gathered less formally and held within the manager's files. The range of information that is needed about each person will include details of age, education and professional qualifications, technical skills and abilities and aspirations for the future, etc. It is easy to compile a list of information that is useful for the manager to have, but this should be balanced with questions of the privacy of the individual and discrimination against certain categories of staff. In collecting the information consideration will need to be given as to whether you are examining personality or performance, who shall make any assessment of performance if this is required, the supervisor, the peer group, or both? Is the information collected to be fed back to the individual, thus allowing for modification and their comments to be added, and whether the action or method of making the assessment will affect the working environment of the system. These are sensitive questions, the answers to which will be determined to a great extent by the nature of the parent organization and the skills and personality of the unit's manager. The procedures briefly outlined are far less sophisticated than those which may be used in larger firms where pencil and paper tests, projective tests and sociometric tests may be administered by trained staff attached to the personal department.

If the individual member of staff is to be assessed as part of a staff development programme then the system must respond with certain information. The individual will need to be able to see an organizational structure operating both within the unit and the parent organization and to be able to locate where their position lies within it. They will need to know the prospects for upward or horizontal mobility within the organization, both for professional and for clerical and secretarial staff. Policy decisions concerning promotion, such that managers of R & D information units are drawn from R & D scientists rather than from the information staff, or that promotion to junior professional posts is not opened to 'A' level clerical recruits should be clearly stated and understood. The individual needs to know of the duties expected of them, the levels of qualifications needed to undertake such work and their responsibilities. Routes of communication within the organizational structure help to clarify relationships between staff. Clearly stated job descriptions help to determine the daily responsibilities of the individual, and for the manager, illuminate the grey areas of duplication of effort and gaps in coverage.

Feedback on how the manager sees the work performed by the individual will help to increase job satisfaction. We all like to be told when a job has been well done, and it may also be helpful to be told tactfully how a job may be better done on the next occasion. Feedback and response will reveal more about a person, their special abilities and weaker points. Not all staff will hold their ideal post which satisfies all their work needs, but any effort made towards making a job rewarding, which increases job satisfaction, will be welcomed by staff who may have to stay longer in a post than they would like, or who are unlikely to gain additional real financial incentives at the present time.

If the manager feels it possible to introduce and successfully manage a move towards a more participatory or open style of management this may be welcomed by the staff. However this must be introduced with care, adequate planning, and a commitment on the part of the manager.

Finally in considering the individual it is taken that this will include all staff working within the unit, and any staff whose services may be shared with other departments. In having a continuous programme of some form of assessment of staff considerations of job enlargement, job enrichment, job design and job rotation need to be examined, but these matters lie outside the scope of this short review.

The final section of this paper is concerned with staff development. In preparing programmes for staff development we are concerned with enhancing the general education levels of all staff, continuing formal professional education, in-service training and skills development together with the personal growth of the individual. In the matters of improving the general educational level and professional qualifications we may be advising staff to consider taking on OU degree if they are non-graduate clerical or professional staff. For the staff having professional library qualifications but who are of non-graduate status the alternative to an OU degree is to take one of the ALA to BA courses on offer at a number of library schools. These courses offer a number of modules designed for the middle manager and are designed for part-time study. For the graduate with professional qualifications or the FLA there are opportunities to take higher degrees at most of the information and library schools. This can be an interesting and rewarding way of developing interests in specific areas of management or advanced technical skills. Managers should be able to advise their staff on opportunities open to them, to give them positive encouragement and take an interest in their progress, and where possible arrange for financial help and time for study.

In designing programmes for the other areas of staff development it may be helpful to examine the six common approaches in management training programmes which have been identified by Morris and Burgoyne,[4] which may be adapted to the information field. They are:

1 Attempting to provide an opportunity for looking at the background of management activities.
2 Providing an opportunity for managers to learn rigorous techniques of analysis and decision in relatively clear-cut situations.
3 Providing an opportunity of learning about the functional requirements of a specialized post within the organization.
4 Developing greater effectiveness in seeing problems from a general management point of view.
5 Providing managers with an opportunity of sharing experience by focusing on areas of common interest in either opportunities or problems.
6 Enabling managers to work on opportunities or problems and hence to make recommendations and manage their implementation in the context of the organization.

The only alteration I would make would be to substitute staff for the word manager, for it is essential for all staff to have the opportunity to receive training at this level. However it may be unrealistic for the smaller system to adopt such ideals and to develop their own programmes, but sources of assistance are available.

In the larger organizations there will be training departments which can assist in the preparation of internal courses, and which will have the knowledge of external courses which may be helpful in areas such as staff management, costing, etc. Through a training department there may be access to an industrial training board which may organize courses on an industry-wide basis for information staff.

At a professional level there are courses organized by bodies such as Aslib and the Library Association. Sub-groups also organize training programmes for those working in specialist fields to teach technical skills, and more recently courses have been organized which are either totally devoted to, or have a content concerned with the development of communication skills and interpersonal reationships in the library and information context. The current difficulty about this type of course is that it is becoming increasingly expensive to send staff away for two or three days when costs of staff time in addition to the course fees are examined. There would seem to be a need for more courses to be organized north of Watford and west of London Airport. Similar financial difficulties exist with the short course programmes offered by the information and library schools. Until recently we were finding that it was possible to organize courses in pleasant hotel surroundings which offered, in addition to good speakers, a four-course lunch with wine. At the present time the schools are rapidly adapting to a changing situation by planning courses to run on six successive Wednesday afternoons and the gourmet lunch being replaced by beer and crisps at opening time. Certain schools are also offering to provide on-site training courses tailor-made for organizations having larger staffs.

One way of providing development programmes that seem not to have been organized extensively is to organize courses on a local basis co-operatively. There have been the short courses run by local co-operative schemes concerned with resources in a region, but the type of courses that could be developed might be in the field of communication skills and inter-personal relationships. It could be a way of sharing costs, having the benefit of the staff being taught by specialists in teaching these particular skills and bringing staff together from a variety of different types of organization which might have spin-off in helping other local co-operative activities. Local technical colleges, business schools, as well as information and library schools could help in designing and running such courses.

This has been a very short review of the realization of staff potential but in conclusion I would like to draw your attention to an analogy that Murrell[5] has drawn in discussing motivation which is what this is all about.

He likens motivation to a three-legged stool where, if one leg is taken away, the stool will fall over. One leg is a social leg, which implies a recognition that every enterprise is a social community and that many people come to work to be part of a community, not just to earn money. An organizational leg involves worker participation, job enrichment, etc. The financial leg implies that everyone in the enterprise gets a share in accordance with their value to the enterprise. He says that generally attention is only focused on one leg to the exclusion of the others. The financial leg gets the greatest attention, there is greater emphasis being placed on the organizational leg at present, as Ganz and Olson will report later this afternoon, but the social leg is still the weakest and least appreciated, and this is likely to be the most critical in the information field in the immediate future.

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DISCUSSION

Session 1: *Design* and *Management*

MR R. WALL (Loughborough University) asked Mr Vickers for some explanation of the differing levels of performance required from systems.

MR VICKERS replied that people will have different expectations of systems in terms of speed of response, etc. Some systems require 100 per cent correct answers to be given, such as one providing remedies for the swallowing of poison, but if one rang somebody for information on road transport it would be very worrying if it was provided all at once (and one would need a large lorry to carry it away anyway).

MR T. M. AITCHISON (INSPEC) commented on the fact that Cleverdon's work at Cranfield had showed something of what was wrong with existing measures of performance, but that as yet there had been no answers found.

MR VICKERS replied that he agreed, and regretted that the Cranfield work may have led to some complacency in this area of study.

MR HILL (British Library, Science Reference Library) asked whether there seemed to be a basic incompatibility between system design in the sense in which the speaker had discussed it, and the design of an information service in the sense in which most of us provide it. To use the speaker's analogy of air transport, an aeroplane is designed to transport a group of people from airport to airport. The individual wants to get from door to door, and to a different door from each other passenger. Our information service aims to provide a unique, never-to-be-repeated answer to each unique, never-to-be-repeated question. Secondly, just as to get from door to door we use a series to different modes of transport—plane, train, but—so we use a series of systems to provide the ultimate answer. And just as we find that our various transport systems too often do not dovetail together (the next bus has left five minutes before the train arrived) do we not find also that the systems within the series (machine, punched card, personal) do not fit well together to allow us to use the most efficient combination? Should we not be directing our systems design effort at the problems of linking existing systems rather than at the design of new systems?

MR P. VICKERS (Aslib) asked Mr Kemp how, bearing in mind his structural approach to problem solving, it is possible to select one problem from among several, and how could one decide on the best order in which to tackle them.

MR KEMP replied that this focuses on the activity of definition, of sitting down and consciously thinking about how much it is worth to one to get that problem solved. After asking what people, what equipment and what time will be needed, the crunch comes when one asks 'is the money worth it?' Again, there may be constraints on the actual procedure for tackling a problem; who, for example, can we speak to, and who can't we speak to?

MS E. MARCH (Rutherford Laboratory) pointed out the lack of refresher courses for experienced but unqualified or non-professional staff.

DR LAYZELL WARD agreed that this type of course was lacking. The Library Association had provided some refresher courses, but at a general level, whilst there was a need to offer something more specific for those who had been working in the field for a long time. The library schools were recognizing the neglect of the non-professional, at the same time as managers were continuing to struggle with the problem of keeping such people in their jobs.

MS E. ORNA (Engineering Industry Training Board) asked Mr Kendal whether he thought it reasonable to let the nature of the job be shaped by the people available to do it. Might there be some danger in treating jobs and job descriptions as fixed and unchangeable, a sort of Procrustes' bed to which people have to be tailored or registered? A wide range of people can perform satisfactorily, though in different ways, in a given job. Should we not also think in terms of re-designing jobs to meet the nature of the manpower available?

MR KENDAL replied that the short time available to him allowed only a very direct approach to the subject, and the suggesting of a framework. He did feel that it was right to stress the warning that we should not be too strict, since in practice it will be found that there are a number of ways of dealing with any situation. There does, however, seem to be a need for some controls.

MR G. GUIRGUIS (WHO/EMRO) stated that there is concern abroad about the status of short-term courses offered to overseas librarians. Nowadays not many students come to Britain to engage in long-term qualification courses, but rather the tendency is to the attending of short-term courses. An overseas student usually has a programme divided into two components, consisting of some general theoretical lectures which are somewhat unrelated to his needs, and assignment to a library for practical work experience, where he will often lack the attention that would really build on his skills. A tutor who is usually responsible for a number of students may not allot sufficient time for bringing together the two components of the student's programme. This problem may not be resolved at the level of the library school alone; there should rather be a commitment on the part of professional organisations, such as Aslib and the Library Association, and these bodies should perhaps be able to supervise and accredit some of the on-going short-duration programmes for overseas students.

DR LAYZELL WARD affirmed that the problems of overseas students are very real ones, and that the situation will probably become more difficult in the future. Finding a suitable system at the Polytechnic of North London School of Librarianship has been difficult, and has absorbed a great deal of staff time. Could we bring the overseas systems to contribute more to the development of these students? It is particularly difficult to relate the student's studies to their own cultural situation, and this complex problem demands co-operation from both countries involved.

MS D. PALMER (Smith Kline and French Laboratories) observed that three years ago the Library Association Industrial Group has compiled a list of libraries offering vacation employment and practical training to students; this had been offered to library schools and was met with a deathly silence. Smaller industrial libraries often have no educational programmes for non-qualified staff, which if provided might help the individual towards job satisfaction. The Library Association Industrial Group advocates a new level of certification, somewhere between ONC and HNC and which would take three years of part-time study. This would result in a meaningful qualification, meaningful to the employee and to the employer, as a yardstick for assessment, status, salary level, etc.

DR LAYZELL WARD replied that we need training programmes at the technician level, as provided in the USA, which offer real satisfaction to students. On the question of not taking up the Industrial Group's offer, she suggested that this was probably a function of the economic climate, in which students urgently need to earn money to support themselves, and which libraries are usually unable to supply.

MR H. HANNAM (Commonwealth Secretariat) agreed with Mr Kendal that a disciplined approach is necessary for good staff selection, but the fact remains that the selection processes themselves are still very imperfect. Long experience on selection boards makes him sure that greater weight is given to the interview than to a candidate's qualifications and experience, and that often all that is established is which candidates are good at interviews. Likewise, the possession of degrees and professional qualifications indicates those which are good at passing examinations but not necessarily good at a particular job. Perhaps the use of more aptitude tests or a trial period of appointment might provide a solution?

MR KENDAL in reply suggested that interviewers need to be better trained; the interview is one of the selection processes which will always remain subjective, but it should be possible to detect the man who is just good at interviews. He did not advocate more tests, since we have too many already.

MS. J. COLLINS (Aslib) asked where Mr Kemp would place communication in his outline.

MR KEMP replied that it would be two-way communication and should appear all along the line. Once the appropriate people have been recognised, hopefully they can be involved in the making of any decision, and it then will not be necessary to sell it to them.

MR R. E. OLDROYD (Plymouth Polytechnic) stated that many applicants for posts do not do themselves justice, by submitting poor applications, with not enough information, and this badly presented and often showing a lack of appreciation of the job they are applying for. He urged both library schools and employers to discuss job applications with their students and employees respectively.

MR KENDAL added that there is a tendency to do no more than send in curriculum vitae which bear no relationship to a particular job and will therefore not receive proper attention.

The role of scientific communication in the process of technological innovation

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Paper presented at the 50th Aslib Annual Conference, Exeter University, 20th–23rd September 1976

CURRENTLY INUNDATING the United States is a variety of guidebooks to the future of information. Daniel Bell's, *The Coming of the Post Industrial Society* was preceded by Fritz Machlup's discussions of the 'new society' in the first edition of *The Production and Distribution of Knowledge in the United States*. Other contributions which discuss the notion of the information or service-based society to come include Edwin Parker, W. W. Rostow, Peter Drucker, and Ken Boulding. The argument here is that the scientific and technical information and communication industry is a small but significant part of the total knowledge sector economy which will certainly dominate the future of the developed world.

We are also currently and perhaps equally in the midst, in this Bicentennial year, of a movement to prove that government involvement in the formation and implementation of information policy is necessary. Those individuals, founding fathers or revolutionaries, depending on your perspective, engaged in early US development policy, recognized the need to improve information flows. The growth and economic productivity of the US it was argued would depend on rapid and effective communication of intellectual as well as physical goods and services. Resources should and could be guarded carefully and used expeditiously.

But a third view is making itself felt. Nowadays, the need for self-improvement has spread around the globe, generating tension between the technocrats, the elite, the producers, and the exploited, the under-developed, the ignorant. Rights to privacy conflict with accountability; intellectual property rights represented by copyright and patent laws conflict with public access to information. We had better decide to do something about distribution now; it will be too late tomorrow. Toffler in *Future Shock*, brought to public attention societal consequences of maladaption to change. Schon, in *Beyond the Stable State* argued that the social environment is necessarily unstable. During the time, he says, required to solve current problems let alone implement them, they are being replaced by others of greater complexity and magnitude. Traditional problem-solving tools are necessarily ineffective. The revolution will be tumultuous, because new tools for solving these problems are not on the horizon.

In the midst of this divergence of views as to whether to look to the future or to the past for guidance, along with the view that no guidance exists, deter-

Aslib Proceedings, 28 (11–12), November–December 1976, p. 385–91. Printed in Great Britain

mining priorities in information policy and research is difficult. The following indicates results of research initiated in 1974 and describes some current projects the results of which will not be available for two years. Optimistically, the research manager can only hope that if the solutions proposed are problems already past, we are at least developing research tools which deal better with future problems.

In 1974, the National Science Foundation's Division of Science Information initiated support of several studies aimed at increasing understanding of the role and contribution of scientific and technical information to the process of innovation. The following summarize results from these projects, now available, places them in some context, and indicates other related projects. It is intended to suggest future research directions, to guide the development of more adequately designed information products and services, and to encourage experiments with management and policy techniques more responsive to the requirements of science information producers and users.

Type of researcher studied

The individual subjects of the Gellman–Feinman survey project, *The Functions and Contributions of Scientific and Technical Information to the Process of Innovation* (Gellman Research Associates, Aaron J. Gellman, Stephen Feinman), were not selected on the basis of scientific or engineering discipline, nor on the basis of their participation in a particular phase of the research and development process. They were selected on the basis of their successful contribution to 100 innovations in a wide range of industries. The research assumes an explanatory model of the process of innovation, substantiated by observable events, and participated in by the individuals studied. Innovation in this model proceeds from a conception/ideation stage through research and development to an engineering/production/marketing phase that terminates the process of innovation with the introduction into the market place of a product or service. The project however concentrates primarily on the kinds and channels of scientific and technical information used by the innovators studied, within the ideation/conception stage of innovation.

Recommendation for types of information products

The results of the project indicate that in a list of periodicals reviewed regularly, *Scientific American* or another 'non-professional' or 'popular' science publication was read by the majority of innovators interviewed, and this seems to be the only common element in formal information use among the group. Thus, the type of scientific information production which innovators employ to the greatest degree already exists in the form of popular science magazines.

The recommendation made in this report is that innovators might benefit from a number of publications of the quality of *Scientific American* which could concentrate primarily but not exclusively on individual industries and could be commercially produced. A second specific recommendation is made, that is, to consider publication of a weekly current awareness publication which provides wide dissemination of the activities and opinions of a diverse readership by printing their letters.

Significance of results

The study basically confirms the results and interpretations of several recent empirical studies of successful technological innovators. To appreciate its significance, its purpose must be understood as providing a data base for improving the productivity of research. Through improved understanding of the information flow and management variables involved in the innovation process, considerable leverage can be exerted to improve the R & D process, and with it, reduce the costs or increase the benefits of research investment.

Before unrefereed weekly popular science magazines are initiated and the formal journal system is tampered with (with unforeseen consequences), we must be aware of the boundaries of this innovation model. The first constraint is that not all innovations originate from the market. There is the whole area of public goods, however their limits may be drawn, such as education, health, welfare, in which the end-product of innovation is not a marketable good or service because these are not distributed through the market place. The second point is the limits placed by the model on the range of scientific and technical information. The innovator searches for a technical result to solve a human problem or he begins with recognition of the potential value of a technical result. In either case, the products of scientific or technical research with which he begins are viewed as a set of facts about the universe; in and of themselves they contain no applicability to the solution of human problems.

The conclusion is: a realistic evaluation of the potential of information products and channels to increase research productivity must be wider than this model allows, that is, include first, non-marketable goods and services and second, the complete range of research results reported in the scientific literature.

The idea generation stage of innovation is not well understood

But what is the range of research results available to the innovator? Basic research as defined by the model is a segment of knowledge which is explicitly separated from usefulness, application, and practical significance. Its primary users are limited to scholars and other basic researchers usually within the academic community. The reward structure of this community is portrayed to be very different from applied research organizations and is based on peer estimates of one's contribution to the discipline and on a recorded end-product, also peer-reviewed. The argument usually goes as follows.

Premise: the reward structure in science is based on one's contribution to a body of knowledge, and on the end product being recorded in an archival form.

Conclusion: in chemistry, for example, knowledge is only valuable for its own sake. But the conclusion does not follow from the premise. That science entails a certain reward structure and final product does not imply in and of itself that the results it produces are not useful. It is not then innovators who make it of value in solving human problems. That basic research results are less useful to people than applied research is an implicit value judgment built into the model of innovation.

Another way to represent this limitation in the innovation model is through its attempt to portray the body of scientific knowledge solely as a collection of empirical statements about the world. But scientific knowledge also includes methodologies, rules of evidence used, relations between theories and facts to support those theories, operational definitions, instruments of measurement and measurement and analysis, and allowable rules of reasoning, to name a few. It is these which distinguish what we call science from what we call mythology or theology.

The ideation/conception stage of the innovation model is based on this limited concept of scientific knowledge as value-free facts. In the ideation/conception stage, the innovator's thought processes involve sources of technical information separable from sources of economic or marketing information. The applied researcher, for example, reviews a new 'fact' in a scientific journal; this stimulates his memory of an economic need, retained from a non-technical information source. Subsequent review of the technical literature is then sought to verify whether the scientific fact is or is not applicable to satisfying the economic need.

In this model, some bits of informaton stimulate other bits which turn out to be applications of a theory the applied researcher already knows. *The question*: which bits of technical information stimulate and how does the stimulation work? The question in more generic terms is to pinpoint the interface between science and technology. This not being the place to go into an elongated discussion of scientific communities nor the structure of science, I can only allude to some places where solutions can be found.

Thomas Kuhn, in 1962, in an attempt to explicate scientific discovery or invention describes the classes or problems which he claims exhaust the literature of science:

—determination of the significant facts of a theory
—testing the facts initially associated with a theory
—articulating additional facts of the theory
—discovering new theories

In the scientific literature then, in Kuhn's view, fact and theory are never independent. Extension of this view to innovation implies that the particular facts with which the process of technological innovation begins cannot be isolated; explicitly or implicitly they are theory-related and function as models or examples of theories. Facts cannot be identified and used independently of the theory of which they are a part.

Kuhn makes an additional claim: scientific theories and their facts cannot be identified independently of the values and standards held by the scientific community which legitimizes these facts and theories. The discovery that the theory applicable to one fact can be extended to another is not the perception of a relation between facts, but must involve comparison between entire ranges of theories and values. Discovery or invention may involve the reconstruction of theory, the re-evaluation of accepted facts; it may affect the standards and values under which a scientist or technician determines what counts as an admissible research problem or a legitimate problem-solution.

The conceptual framework of innovation

The other research project, initiated in 1974 at Georgia Institute of Technology, attempts to provide a framework for understanding the flow of scientific and technical information in applied research. (*Flow of Scientific and Technical Information in the Innovation Process: An Analytical Study*, Melvin Kranzberg, Patrick Kelly).

In this research, some of the underlying assumptions of the innovation model become explicit. There is a distinguishable institution which produces basic research and a distinguishable institution called end-users of this research. Applied research, the R & D organization, is an institution with a dual orientation interfacing with basic research on the one hand and application, making something practical on the other. It also becomes explicit that while communication in science involves generating, and using publications, the situation in applied research is very different. One should be extremely cautious in attempting to apply any currently existing understanding of science communication to technology.

The Georgia Tech project relates to another study (*Managing the Flow of Technology*, Thomas Allen, Massachusetts Institute of Technology), a ten-year research effort currently being concluded. In this research, the discovery of a wise variance in the manner in which applied researchers receive and use technical information led to the concept of the technological gatekeeper, the linking agent between the R & D institution and the products and institutions of basic research. The Georgia Tech project attempts to explicate the interface between the applied research group and his sources of commercial/marketing information through another linking agent.

Both studies conclude that people and not formal channels of communication are more effective for transmitting technical information. In addition, frequency of communication among researchers is determined more by the architecture of the work place than by the technical needs of the research project. Generally, scientific and technical information suppliers should concede that the formal channels of communication are not that useful to researchers in organizations and that informal channels will continue as the dominant form of communication.

Before the recommendations for improving informal channels of communication are taken, we should again look at the innovation model assumed in these studies.

The innovation model involves a basic trade-off

Innovators within applied research organizations are thought of in the model solely as users, never generators, of both technical and market information. Intrinsic also to the model is the claim that the application of scientific information by the innovator always involves economic gains for the organization if the idea works out. It is within the ability of the innovator to successfully bring technical information together with commercial/market information, and to advocate ideas with market potential. Innovation has been characterized in the literature as a compromise between the results of science and the market information necessary for application.

What is never stated are the terms of this trade-off. It is agreed that in basic research communication the user and the generator of scientific information belong to the same research community, with shared values. In addition, the user, the research scientist, is both searching for relevant technical information and also rapidly disseminating information about his own work. It is not surprising then that formal channels work effectively. In applied research, the innovator may begin with information concerning an economic need and search for the technical means to fill that need. He is attempting in doing this to use a literature produced by generators of information with different values and motivation. Scientific information is generated to be used by other scientists and form the basis for their future scientific work, not to meet the applied researcher needs. On the other hand, the innovator sometimes begins with the recognition that a technical possibility may meet an economic need. His motivation to communicate with other researchers, and obtain technical information to proceed with his work, is always tempered by penalties for sharing this information, having the potential of economic gain, with those external to his organization. Only when more is understood about existing or potential overlaps between these distinct research communities, and when more is understood about the trade-offs between penalties for sharing information and advantages in communication with researchers external to organizations, can either the currently existing informal channels be understood or formal channels be designed to effectively serve applied researchers. Steps to improve access to information by individuals, to encourage free flow of information both in and out of organizations and to encourage mobility and interpersonal contacts must wait for improved understanding of science information resources, the structure of the science community, and the organizations through which information must flow.

Potential research areas to explore

An alternative to the innovation model has been developing for several years which also attempts to provide an understanding of the processes of dissemination and research application. The dissemination and utilization (D & U) model proposes another explanation of the transfer of information, through various media, between resource systems and users. DSI is intending to sponsor several experiments using this model in order to evaluate its potential to improve the role of scientific information in the process of innovation.

D & U models do not limit, as innovation models do, the resources available to the innovator to individual scientific facts. In addition the model does not limit the products of innovation to those distributable through the market place. Innovation is seen as a series of connections between entire user and resource systems. Disseminators and users achieve successful communication only when they succeed in simulating each other's problem-solving behaviour. Hence, the resources system must appreciate both the user's needs and problem-solving patterns and the user, in turn, must be able to appreciate the problem solution and formulation processes of the resource system. The model makes an additional claim that this understanding leads to collaboration and relations of trust between users and resource systems which become channels for rapid effective transfers of information.

The future of scientific communications

Views about the coming future of scientific and technical information began this paper; whichever way it turns out, there is no disagreement that information, in one way or another, is going to be important, and that its production and distribution might affect the outcome.

Some recommendations are appropriate here. First, a sincere attempt should be made to evolve communication mechanisms which integrate the currently distinct institutions of science and applied research. Second, the idea that a well-designed system of communication can provide solely for dissemination, without providing incentives for the generation and reporting of research results should be given up. Third, an effective system must be evolved which protects priority of discovery and also encourages the rapid dissemination of technical information. Finally, it might be possible in a technologically advanced society to provide widespread access to science resources and to allow self-critical individuals to make pretty good diagnoses of their own information needs. Over time, the need for intermediary roles will decline. However, for the foreseeable future all fields of knowledge will require the support of a variety of intermediaries if effective utilization of science resources is to occur. No matter then what the distribution of information resources looks like in the future, sensitive aware intermediaries are going to have to be available.

The Discussion of the above paper will be published with the paper by Edwin Olsen, when this is made available.

The demand for business information in an academic library: an analysis of the library enquiry service of the City University Business School

Gerry M. Smith

The City University

Enquiries for information put to library staff during a six-month period in 1976 are analysed according to subject, originator, channel, source and frequency. Results are discussed, along with the implications for library policy.

Introduction

IN A DECADE in which the self-image, if not the actual role, of many librarians has gradually changed from custodian of documents to exploiter of information, much has been written on the place of information services in academic libraries. Whilst there has been a lot of discussion of the provision of current awareness services and library-based induction and teaching programmes, there has been very little description or analysis of enquiry services, which is regrettable because they are the information services most directly useful to the largest number of users of academic libraries. Following the stimulus of being included in an Aslib survey of business information services,[1] which turned out to be more directly relevant to the public commercial than the academic libraries surveyed, I decided to analyse in detail the pattern of demands made on the enquiry service of the library of The City University Business School. The objectives of the survey were both theoretical and practical. Theoretically, I wished to investigate and describe the nature of an enquiry service in a specialist academic library and its place in the totality of library services. The practical objectives of the study were: (a) to check the suitability of reference and other collections established specifically for answering enquiries; (b) to formulate guidelines for future collection development; (c) to check for gaps in my own knowledge of information sources; (d) to provide raw material for use in the training of library assistants, and to give the many library school students who do short practical secondments in the library a taste of 'real' enquiry work.

Method

It was decided to analyse requests for help in finding information put to the library staff because the enquirer did not know how to find the required information. Directional enquiries, *e.g.* 'Where is the A–Z street guide?' 'Where do you keep books on contract law?' were excluded, as were requests for administrative information, 'Which is Mr X's office?'. Multiple questions (*e.g.* for statistical

Aslib Proceedings, 28 (11–12), November–December 1976, p. 392–9. Printed in Great Britain

data, list of UK and European companies and market research reports on the motor industry) asked by the same person were recorded only once. Similarly, the same question asked many times by different people, as can happen with project groups, was counted only once.

It was decided that a representative survey of enquiries demanded an analysis of questions received from all categories of users over a fairly lengthy period, and that we include vacations as well as term-time periods. Accordingly, the analysis concerned questions received over six calendar months from 16th February to 16th August 1976. Questions asked on days on which the Librarian (Information Officer) was absent, for holidays, sickness periods, or in meetings, were excluded.

Studies of reference services are often weakened by unsatisfactory methods of categorizing enquiries.[2] Most studies employ a classification by time taken to answer enquiries, 'quick reference' or 'ready reference' being commonly encountered categories. When, however, they are used in typologies which also include categories of a different dimension, such as 'subject enquiries', the resulting analyses are not very meaningful. It was decided that the most appropriate variables worth analysing in the present study were: subject, originator, channel of communication, source and frequency.

Results

(a) Subjects

The subject distribution of enquiries was considered to be of the greatest practical importance for evaluating current collections and planning their rational development, and for concentrating the training of new juniors, most of whom are completely new to the business field when appointed. The distribution (Table 1) shows a marked preponderance (38 per cent) of enquiries requiring information on management and business functions, practices and techniques. Any librarian working in such a library thus needs an extensive, if

	No.	%
Management and business functions, practices and techniques	133	38
Economic data	42	12.3
Companies	37	10.6
Miscellaneous	36	10.3
Industries	29	8.3
Educational institutions	22	6.3
Legal environment	19	5.4
Organizations (excluding companies and educational institutions)	19	5.4
People	7	2
Social data	5	1.4
Countries and regions	1	0.3

TABLE 1: *Subject of enquiries* (n = 350)

superficial, knowledge of the subject field, especially in view of the remarkable variety of subjects covered by this category. The unexpectedly high proportion of 'miscellaneous' enquiries, *e.g.* 'What size is A6 paper?' 'Can you recommend books on rapid reading techniques?' 'Where can I find material on the history of the study of statistics?' justifies, I believe, the inclusion of a common core of reference expertise in the education of librarians and information workers: it is reasonable to assume that such questions form a significant minority of enquiries received in most specialist libraries.

Whilst the level of requests for economic data came as no surprise, the demand for information on educational institutions (6.3 per cent of all questions) was unexpectedly high. Many of the requests for information on educational institutions were for information on foreign institutions. (This international perspective makes an interesting comparison with the lack of such a perspective revealed in the demand for information on companies.) That 10.6 per cent of all enquiries were for company information and 5.4 per cent for information on other organizations was not surprising and justified the library's collections of directories, company information cards and company annual reports. However, as further analysis revealed that all but 2 of the requests in this category were for information on *British* companies, it seems that our acquisition of the European *Kompass* directories (currently costing £200 p.a.) and subscriptions to the *Extel* European and North American company card services (£150 and £157.25 p.a. respectively) were expensive mistakes. As there infrequent requests for overseas company information can be met by referral to the nearby City Business Library and SMIL, subscriptions to these services have been curtailed.

An earlier survey of the use of business and management books in UK business schools[3] drew attention to the staggeringly low number of heavily used books dealing with specific industries and wondered whether this indicated that business schools were not studying industries or that sources other than books were being used. That 8.3 per cent of our enquiries were for industry information tends to support the latter explanation. (The percentage of enquiries on industries has, in fact, been kept artificially low by the definition of industry enquiry used in the survey: only those enquiries requesting a wide range of industry data—major companies, output, markets, prospects, etc., were included in this category; the many enquiries requesting more specific information were assigned to the other categories.) The virtual absence of enquiries on countries and regions was unexpected and has led to decisions to stop speculative buying of monographs on the economic conditions of foreign countries and also to throw away a collection of supplements taken from daily newspapers (mainly *The Times* and *Financial Times*) which we had been developing for six years. The lack of demand for information on people indicates that there is little need to increase our stock of specialist *Who's Who* type directories.

A useful by-product of the breakdown of enquiries by subject, is that we have an indication of which areas to concentrate our efforts in our information research teaching and publication programmes.

(*b*) *Originators*

One advantage of conducting such an analysis in a small academic library

Postgraduate students	*Academic staff*	*Undergraduate students*	*Outsiders*	*FT research students*	*Alumni*
133 (38%)	104 (29.7%)	52 (14.8%)	25 (7.1%)	21 (6%)	15 (4.3%)

TABLE 2: *Originators of enquiries*

is that originators of requests can be easily identified and placed in useful categories, without having to ask for such information.

Readers' understanding of Table 2 will be enhanced by knowing that the total number of potential regular users in each category was: academics 40; full-time research students 20; postgraduate students 150 and undergraduates *c.* 140 (for part of survey only); the numbers of alumni and outside users are, respectively, very large and infinite.

The major point of interest to emerge from this breakdown is that people from all groups use the library enquiry service, and must, therefore, regard the service as a valid role of the librarian in the library under discussion. If this is generally true, it seems to conflict with the depressing conventional wisdom that librarians have little credibility as information resources in academic communities.

Although it was not separately recorded, the demand from students on taught courses tended to coincide with the start of individual and group projects. Virtually all of the needs of the undergraduate students were generated in this way. The numbers of enquiries by 'outsiders' and 'alumni', though relatively small, are encouraging: they indicate that there is a potential audience for the library's services outside the University walls, which could probably be developed.

As well-informed librarians and information scientists might expect, an analysis of enquiries by individuals in each category provides yet another example of the Pareto distribution: *c.* 20 per cent of the people in each category eligible to make demands on the service accounted for *c.* 80 per cent of all requests. This phenomenon could be explained by satisfied customers returning for more or it could be an indication of the differential information awareness and needs of the members of the library's clientele.

(*c*) *Channels*

The predominance of personal approaches for information, shown in Table 3, will not surprise academic librarians. Only outsiders, alumni and academic staff in outlying buildings made telephone enquiries; all other groups made enquiries in person to the Librarian or his assistant. One implication of this

	No.	%
Approach in person	284	81.1
Telephone request	63	18
Written request	3	0.9

TABLE 3: *Channels of communication*

finding may be that an effective library enquiry service is used more readily if it is visibly accessible. Evidence for this was obtained during the survey when the librarian measured the effect on the numbers of enquiries of alternately manning an enquiry desk near the entrance of the library and working in his office at the library's extremity. New and inexperienced users furnished substantially more enquiries when the Librarian was visibly available, but experienced users, having assimilated the informal ambience of the library were not deterred by having to knock on the Librarian's office door.

(d) Sources

Classifying enquiries according to type of source used to answer them presented difficulties in the appreciable number of cases in which more than one type of source was used: this problem was circumvented by assigning each enquiry to only that source which was the most useful in providing the answer. Table 4 shows that bibliographical publications were used to answer 30.6 per cent of all enquiries, the majority being answered by recourse to a very small number of sources, *British Books in Print, Business Books in Print, BIM Reading Lists,* the various abstracts produced by *ANBAR* and *Research Index.* Library policy of acquiring any new specialist bibliography produced in our subject field was justified as virtually all of the recent bibliographies were actually used. The usefulness of specific bibliographies suggesting that there may be scope for many more. Specialist directories, encyclopaedias, handbooks and dictionaries were also heavily used (22 per cent of all enquiries were satisfied by using them), Heyel's *The Encyclopaedia of Management,* Kempner's *Handbook of Management* and the Kluwer–Harrap looseleaf *Handbook for Managers* proving indispensable. *Britain: an official handbook* answered 15 queries, and so earned its place in the collection. From a collection of statistical serial subscriptions which includes slightly more than half of the titles listed in *Recommended basic statistical sources for community use,* only 4 series, *Annual Abstract of Statistics, Monthly digest of statistics, Business Monitor* series and *Social Trends* attracted anything approaching regular use.

The small percentage (9.4 per cent) of referrals to outside sources can be taken as one indication that the library has established a high level of self-sufficiency in information provision (although the cost of this level of self-

	No.	%
Bibliographical publications	107	30.6
Directories, encyclopaedias, etc.	77	22
Statistical series	48	13.7
Librarian's memory	48	13.7
Outside source	33	9.4
Special files	22	6.9
Prospectuses	6	1.7
Monographs and textbooks	5	1.4
No answer found	4	1.1

TABLE 4: *Sources*

sufficiency is high, as will be discussed later). It could, of course, also indicate an avoidance of the library by users taking their enquiries to a more specialist service, thus avoiding referrals, but this possibility assumes a fairly sophisticated knowledge of sources by potential users. Half of the outside sources were libraries, with City Business Library and SMIL getting most referrals, as would be expected in view of the excellence, accessibility and proximity of these national collections. The other half of outside sources used were personal contacts, mainly in the business information world: proof, if it were needed, of the value to librarians in business environments of developing and maintaining contacts. That only 1.4 per cent of enquiries were dealt with by reference to our collection of textbooks and monographs is adequate response to those few users who see a business school library as a textbook ordering service and warehouse; it demonstrates a significant demand for materials not directly recommended by teachers. The unanswered questions, though statistically insignificant, were useful in dispelling any notions of 'reference omnipotence' in the minds of the library staff. Readers wishing to display their superior knowledge of sources might wish to know that the four enquiries in question were: (i) Which document gives me the retail price of different grades of coal, on a month-by-month basis? (ii) Can you supply publication details of the 'Würdiger report' on European company law? (iii) What is the classic work in management by a man called Vann? (iv) What is 'Business Research'? (the last enquiry could, with hindsight, probably have been answered by a trip to the Registry of Business Names).

(*e*) *Frequency*

The most surprising finding to emerge from the survey was the unexpectedly low number of enquiries made: in 95 working days on which questions were recorded, over a period of six calendar months, only 350 requests were made, an average of only 3.7 per day. As the vast majority of enquiries took less than 5 minutes to answer, the service occupied an average of less than 20 minutes per day, *i.e. c.* 5 per cent of the Librarian's time. This is in a small, informally-operated social science library with a strong information service orientation, serving a school with a fairly heavy reliance on projects. The average time taken to answer enquiries would have been greater, except for our strict adherence to a policy of directed self-help; we believe our role is to give expert directions and that users should then use their own expertise in evaluating information (hence we do not, for instance, compile bibliographies).

Conclusions

Several conclusions about the enquiry service under review can be drawn from the survey, some of which may have wider applications. Perhaps the most encouraging conclusion is that all groups of users regard the library as a resource which can help them solve specialist information problems. This is as it should be, of course—one would expect all categories of buyers of hi-fi equipment or Scotch whisky to assume that sales assistants were knowledgeable about *their* wares. The second generally applicable conclusion, which confirms previous work in this field, is that, even though the enquiry service is valued by users, it takes very little time to operate effectively. To compare it with other library outputs, while the library was dealing with 350 enquiries in 6 months, it also lent 5,000 books, handled 300 inter-library loan requests, and circulated 300 current contents bulletins. I have argued elsewhere against over-provision of academic library information services generally[5] and against the provision of expensive current awareness services in particular.[6] I consider the findings of this survey add further weight to the argument.

Knowledge used in answering enquiries had been picked up entirely 'on the job' and kept up-to-date by active involvement with professional peers and keeping the output of publication under constant review. If this were true of other subject fields and in different types of library, it could be interpreted as a weakness in professional training programmes.

The most disturbing finding of the survey was the small proportion of reference sources actually consulted—the great majority of questions were answered by about 20 per cent of the items in the reference collection, measured by shelf-space occupied. (A more adequate measurement, by cost, would be very time consuming and probably very depressing.) This finding can be viewed as indicating that expenditure on much of our reference collection was wasted, or, to put it less crudely, that the marginal cost of achieving 89.5 per cent self-sufficiency is extremely high. The differential productivity of reference sources probably occurs in all libraries: the striking evidence of its existence in the business field is now borne in mind when selecting reference material. A slightly less disturbing finding to emerge from the regular 'post-mortem' of methods of answering enquiries (used for their training and refresher value) was the variability in sources used: questions which had originally been answered from, say, ABC were often answered from CDE at the 'post-mortem'. Although only a few enquiries had received inadequate or insufficient answers, this inconsistency was surprising and has led to a slightly more systematic approach to enquiry work.

A survey such as this one has many limitations; foremost amongst them is the fact that the survey tells us nothing about the information problems that people solved themselves either by using library sources without an intermediary, or by other methods. Secondly, although it is usual for such surveys to report very high satisfaction rates, the measure used is extremely crude and only tells us the Librarian's evaluation of the solutions: the enquirer's evaluations might be quite different. Despite these reservations, the results and methodology of this study are presented in the belief that they may be applicable in many libraries. Used in conjunction with other survey methods, the analysis of the actual demand on enquiry services can provide valuable insights into information needs and usage.

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5 SMITH, G. M. Library-based information services in academic libraries: towards a reappraisal. *Aslib Proceedings*, 27 (6), June 1975, p. 239–46.

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The list of questions recorded in the survey can be obtained from The Librarian, The City University, St. John Street, London, EC1, at a cost of £1.

Letters to the Editor

Sir,

NATIONAL LENDING LIBRARY AND SUCCESSOR

With reference to the letter from the Librarian of the National Centre of Scientific and Technological Information, Tel Aviv (*Aslib Proceedings* June–July 1976, p. 250) is it the function of a 'national' library to act as an international resource in the manner described? What is the cost to British publishers and authors through the BLLD acting thus?

It is interesting to note that libraries not only in Britain but elsewhere are becoming Post Offices for receipt and despatch of books and periodicals from one centre. This is the situation which, as I pointed out earlier, effectively decimated industrial libraries. Obviously, drastic economies are now equally possible in the public sector.

Yours faithfully,
R. MOSS
Middlesbrough

Comment by M. B. Line
As a result of BLLD's overseas photocopying service, publishers do not (so far as anyone knows) suffer, authors have their articles more widely read, and the BLLD and British libraries actually benefit. As for the BLLD's International lending service, IFLA has agreed that *every* country has a responsibility to lend copies of its own publications to other countries, and it is mainly British books that are lent.

Comment by R. *Moss*
Since the above was written another Aslib journal has published an article from a European publisher drawing attention to the serious consequences of BLLD photocopying on journal sales. (E. Van Tongeran, *Journal of Documentation,* September 1976, p. 198–204).

GROUND RULES FOR COST-EFFECTIVENESS

Sir,
I found Mr Vickers' article on cost effectiveness in the June/July issue very interesting and instructive. However, as one who came in very near the beginning of the setting-up of a library and information service, and who has gone through many of the problems he indicates, I should like to make some comment.

Granted, management does often go about setting up an information service for the wrong reasons or in the wrong way, but the person brought in to run the service is then stuck with what is already in existence, and is also in the position of having to cope with such demand as exists. In these circumstances the somewhat leisurely setting of objectives and designing of the service advocated by Mr Vickers is difficult, to say the least. Assuming that funds are limited and use of the ASLIB Consultancy Service an expense that cannot be afforded, a compromise is necessary. I would suggest it is better to establish a basic service which any information system requires—*i.e.* a good basic stock with adequate methods for retrieval and keeping track of material—and then progress to an analysis of the parent organization's special needs and the best method to meet them.

The chief problem would seem to be to complete this early phase of development while still maintaining status. The basic question appears to be just what sort of status do we want? If the librarian/information officer is sufficiently astute politically, or aggressive, or lucky, or a combination of these qualities, he may get a set on management committees. I would suggest that this is unlikely to advance his true status unless he makes a significant contribution to committee discussions (unlikely—in any case not part of his function), or unless other members of management appreciate his value. How can they gauge his value? Unless they appreciate the skills and capabilities of information work, they can only judge by results—and you only get results by improving the service. Basically, the librarian/information officer is a servant, albeit a fairly qualified one, of the user and there must always be a degree of master/servant attitude about their relationship. I do not suggest that the librarian goes around 'touching the forelock', but the very nature of the relationship puts a limit on the status the librarian can achieve in the eyes of the user—at least in a business or industrial context.

I would suggest the librarian should avoid searching for 'status' which can sometimes be measured by nonsensical things such as the size of his office or piece of carpet, and concentrate on gaining recognition as a worthwhile member of the organization who can produce results that make a valuable contribution to the success of the enterprise of which he is part. That I would regard as true status. The approach advocated by Mr Vickers might help achieve it; I might even try it myself.

Yours faithfully,

ROBIN T. HARBOUR
South of Scotland Electricity Board,
Glasgow

BRIEF REVIEWS

WILLIAMS, B.J.S. Thesaurus of micrographic terms: 3rd ed. rev. by Gordon Harris. Hatfield: NRCd, 1976. 35pp. £2.00 (£1.25 subscribers) (ISBN 0 85267 090 7).

The thesaurus is designed specifically for conducting subject searches into the literature on micrographics that have been abstracted—particularly in *Reprographics Quarterly*—and is held by NRCd.

The thesaurus does not generally define terms but includes, where necessary, scope notes to indicate the meanings of terms in the context of the NRCd system.

Relationships used are 'use', 'includes' (inc.), 'generic to' (gt), 'specific to' (st) and 'related to' (rt). The thesaurus includes descriptors for type of application geographical locality and other facets which reflect the various aspects of microform in practical use.

The third edition is characterized by numerous detailed changes to reflect the development of terminology and applications over the last three years. Particular attention has been paid to the page formating to eliminate some of the 'white space' which characterized the two earlier editions.

THOMAS, ALAN R. The library cataloguing curriculum, USA: a survey of the contemporary compulsory instruction. London: Panizzi Press, 1976. vi, 77pp; 46 tables. £4.00 (ISBN 0 9504909 0 3).

Three of the eight chapters, slightly rearranged and modified, of a Master's thesis submitted to the Queen's University of Belfast. The aim was to disseminate as quickly as possible that part of the research concerned with the 1973/1974 survey of the compulsory cataloguing curriculum in ALA-accredited library schools.

Contents are as follows:

(1) Summary—general profile, for whom is the course intended? sensitivity to library needs, technical repertoire, modern integrated courses;

(2) Detailed comments and tables—organization, design, objectives and content of the course;

(3) Conclusions and suggestions—sensitivity to library needs, technical repertoire, course orientation, course organization.

Appendix A shows the questionnaire letter, instructions and scope notes and the questionnaire form; Appendix B lists the library schools participating in the survey of the contemporary basic cataloguing curriculum.

REYNOLDS, MICHAEL M. Guide to theses and dissertations: an international annotated bibliography of bibliographies. Detroit, Mich., Gale, 1975. 599 pp. $35. (ISBN 0 8103 0976 9).

The guide gives details with descriptive annotations for over two thousand bibliographies and dissertations published up to 1973. Most of the bibliographies are of completed theses and dissertations but the scarcer lists of work in progress are also included. The annotations contain information on the level of work (theses or dissertations), the number listed, years covered, institutions, subjects, arrangement and indexes.

The major part of the guide (p. 44–511) is a subject arrangement, based on the classification used in C. M. Winchell's *Guide to Reference Books*. There is also a section for universal lists, *i.e.* international lists with coverage of all subjects, and a section for national lists. There are no cross references between sections but use of the separate subject index at the end of the guide should help the user to identify relevant bibliographies. The subject index contains entries such as: Great Britain (in), referring to bibliographies of theses and dissertations produced in Great Britain—some of which will not be traced by examining only the national section. There is an index of institutions and an index of names and titles giving compilers' names for monographs and titles of serials.

Any contribution to the scant literature on this subject must be welcomed and the extent of its coverage should make this guide particularly useful to researchers and to librarians. On examining the volume we found the three indexes confusing to use but the eight-page introduction answered some of our queries and working with the guide over a period of time should resolve the difficulties. We note that the compiler mentions the possibility of a later supplement to this guide.

BRYAN, H. University Libraries in Britain: a new look. London, Bingley, 1976. 192 pp. £4. (ISBN 0 85157 218 8).

This survey is based on a visit made by the author in late 1975. The book falls into two halves; the first covering the role and administration of the library and the second the libraries themselves. Part I includes: the library in the university, finance, bookstock, accommodation, staff, technical services, services tó readers, automation and the library outside the university. Tables show the size of teaching spread, collection size and book and periodical accession rates. There are some comparisons with Australian libraries. The reports in individual libraries in the second part are grouped according to locality or date of foundation (*e.g.* Scottish greystone, the civic universities: the big four). Each library is described by staff organization and routine (*e.g* whether subject specialization operates in any way) and general impact of buildding, including opportunities for expansion, and any other details where appropriate (*e.g.* catalogue, microfilm).

HALSEY, RICHARD SWEENEY. Classical music recordings: for home and library. Chicago, American Library Association, 1976. 340 pp. £7. (ISBN 0 8389 0188 3)

This book is aimed at both organizations and individuals. The main section is the composer-title list and the manufacturer's catalogue number-performer list. Best recorded performances of composers' works are identified. These are tabulated by guide number, composer, title, minimum age (categories: (a) adult, (b) secondary or (c) elementary), aesthetic signicance (categories from

(a) masterpiece, (b) solidly designed but deficient in proportion, integrity of expression, etc., down to (c) flawed and insubstantial) and access scale or listenability. This last is on a 5-point scale from (a) work commands attention to (b) austere, esoteric or too arbitrary for most listeners. The minimum age, aesthetic significance and access categories are predicted upon statistical evidence. There are subsidiary sections on buying sound recordings, classification and cataloguing and equipment and environments for listening. There is a glossary of audio terms and a title index to composer-title list and a subject, proper name and composer index.

KOCHEN, MANFRED *and* DONOHUE, JOSEPH, *eds.* Information for the community, Chicago, *American Library Association*, 1976. £6. (ISBN 0 8389 0208 1)

This collection of essays from various contributors is divided into four sections: (1) background to community information needs and services; (2) experience with operational systems; (3) research and analysis toward understanding information needs and processes; (4) concluding comments and directions for further study. This follows the editors' aims of characterizing and measuring needs then developing methods for designing suitable services. Concern is primarily with the need for community information services and the conditions under which they are cost-effective and only secondarily with the library as such. Section 2 includes essays on the Public Information Center Project, staffing and training patterns for an information and referral centre, the Baltimore experience and the Model Cities Community Information Center. Part 3 covers a cost analysis, what makes citizen information system used and useful and an article on research utilization. Finally there is a 9-page, highly selective, resource guide to information and referral centres.

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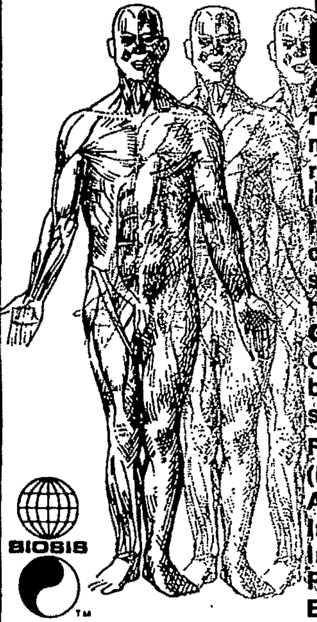

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Published in England by Aslib, 3 Belgrave Square, London SW1X 8PL
Printed at the Alden Press, Oxford

16 FEB 1977